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February 11, 2021

Shad White
Mississippi State Auditor
Office of the State Auditor
501 North West Street
Suite 801, Woolfolk Building
Jackson, MS 39201

Dear Auditor White,

This letter and attached report are provided in response to your letter of December 14, 2018, in which you requested a stress test analysis of Mississippi's public pension systems. The analysis of the Mississippi Public Employees' Retirement System (PERS) included in the report follows Pew's *Foundation for Public Pension Risk Reporting*- a framework for public pension risk measurement designed to aide long-term budget planning and decision making for government plan sponsors and finance officials. The Foundation builds on existing actuarial projections and standards for risk reporting and focuses on the potential impacts of investment risk and contribution risk on government budgets and pension balance sheets.

The key findings of the analysis include:

- **Lower than expected investment returns have been the largest source of increasing pension debt.** Between fiscal years 2000 and 2020, PERS annual returns tracked closely with the broader market and averaged 6.5%, compared to assumed rates of between 7.75% and 8.00%, accounting for $8B in additional unfunded liabilities.
- **Increased annual contributions have been less than the amount needed to improve funding levels.** Since fiscal year 2000, annual state contributions increased by over 50% as a percentage of both revenue and payroll, but still fell short of the amount needed to reduce pension debt. During that period, the funded ratio fell from 90% to 59% in 2020 and the ratio of operating cash flow to assets declined to 9$^{th}$ worst among states by 2018.
- **Investment returns are expected to be lower than the assumed rate going forward.** We estimate long-term expected returns of between 6.2% to 6.6% over 20 years, as compared to the plan's assumed rate of 7.75%, based on the PERS investment policy and the latest outlook for the economy and asset returns.
- **Significant increases in annual required contributions due to lower investment returns are likely.** Based on the outlook for investment returns, we estimate a roughly 70% probability that annual payments as a share of revenue will need to increase by nearly 20% over the next decade, or $200M in today's dollars, assuming requirements to increase payments under current funding policies are met.
- **Increased funding may be necessary to prevent fiscal distress.** In scenarios assuming contributions remain fixed at 10% of revenue, we estimate a greater than 15% chance of long-term insolvency. While hypothetical, this result supports the current policy to increase contributions by some measure.
- **Based on these results, policymakers could consider several changes to improve fiscal stability.** In particular, our results align with the recent analysis from the plan actuary that will require the board to consider contribution increases of at least $150M to $200M in FY2023, when the economy is expected to be in recovery. In addition, our commentary below identifies additional considerations for policymakers including further reductions to the assumed rate of return.

All projections and calculations by The Pew Charitable Trusts and The Terry Group are based on assumptions and other data available in public documents. Baseline projections are designed to match as closely as possible, but not replicate, official projections developed by plan actuaries. Unless otherwise noted, historical data for MS PERS is presented through FY 2020 while historical data for 50-state rankings and national averages use the most recent year for which comprehensive data were available for all 50 states.

We hope this stress test report will be of use in your efforts to inform a broad range of stakeholders on the fiscal condition of Mississippi's largest retirement system; the impact that current economic conditions may have on that system; and to develop policies that address the associated risks of market and economic uncertainty.

Sincerely,

Mike Lowenthal
Senior Manager
Strengthening Public Sector Retirement Systems
The Pew Charitable Trusts

David Draine
Senior Officer
Strengthening Public Sector Retirement Systems
The Pew Charitable Trusts

## Introduction

This stress test analysis of the Mississippi Public Employees' Retirement System (PERS), which administers pension benefits for more than 250,000 active and retired state workers and teachers, was prepared by Pew at the request of the Mississippi Office of the State Auditor. The analysis follows Pew's *Foundation for Public Pension Risk Reporting*—a framework for public pension risk measurement developed in collaboration with the Harvard Kennedy School's Mossavar-Rahmani Center for Business and Government.

Informed by historical trend analysis and using the most recent actuarial projections as a baseline, the Foundation is designed to aid long-term budget planning and decision making for government plan sponsors and finance officials. To do this, we apply standard quantitative analyses to assess the potential impacts of **investment risk**—the risk that investment returns are not as expected—and **contribution risk**—the risk that contributions fall short of the rate required to meet funding objectives—on government budgets and pension balance sheets. First released in 2018, a recent update to the Foundation reflects changes to economic scenarios and assumptions to account for the realized and potential impacts of COVID-19 on state finances and pension investments. **(Appendix 1)**

The stress test analysis for PERS accounts for these changes in economic outlook, as well as the results of the annual actuarial valuation released on December 15th, 2020. In that study, PERS reported a total of $47B in pension liabilities as of fiscal year (FY) 2020 with a **funded ratio** of 59% based on the market value of assets—below the average of 73% for state sponsored pension plans across the U.S. Employer contributions into the pension systems totaled $1.2B in FY 2020—an amount equal to 17.4% of covered payroll or an estimated 10% of state own-source revenue (OSR), a measure of revenue tracked by the US Census Bureau that includes taxes and fees controlled by the state. These data, along with baseline projections included in the actuarial valuation, provide a reference point for 20-year historical trend analysis and a starting point for 20-year forward-looking risk analysis.

**Key Findings of these analyses include:**

- **Lower than expected investment returns have been the largest source of increasing pension debt.** Between fiscal years 2000 and 2020, PERS annual returns tracked closely with the broader market and averaged 6.5%, compared to assumed rates of between 7.75% and 8.00%, accounting for $8B in additional unfunded liabilities.
- **Increased annual contributions have been less than the amount needed to improve funding levels.** Since fiscal year 2000, annual state contributions increased by over 50% as a percentage of both revenue and payroll, but still fell short of the amount needed to reduce pension debt. During that period, the funded ratio fell from 90% to 59% in 2020 and the ratio of operating cash flow to assets declined to 9th worst among states by 2018.
- **Investment returns are expected to be lower than the assumed rate going forward.** We estimate long-term expected returns of between 6.2% to 6.6% over 20 years, as compared to the plan's assumed rate of 7.75%, based on the PERS investment policy and the latest outlook for the economy and asset returns.
- **Significant increases in annual required contributions due to lower investment returns are likely.** Based on the outlook for investment returns, we estimate a roughly 70% probability that annual payments as a share of revenue will need to increase by nearly 20% over the next decade, or $200M in today's dollars, assuming requirements to increase payments under current funding policies are met.
- **Increased funding may be necessary to prevent fiscal distress.** In scenarios assuming contributions remain fixed at 10% of revenue, we estimate a greater than 15% chance of long-term insolvency. While hypothetical, this result supports the current policy to increase contributions by some measure.
- **Based on these results, policymakers could consider several changes to improve fiscal stability.** In particular, our results align with the recent analysis from the plan actuary that will require the board to consider contribution increases of at least $150M to $200M in FY2023, when the economy is expected to be in recovery. In addition, our commentary below identifies additional considerations for policymakers including further reductions to the assumed rate of return.

## Historical Trend Analysis

Between fiscal years 2000 and 2020, PERS pension debt, measured on a market value basis, increased by nearly $19B due to a combination of lower than expected investment returns, insufficient contributions, benefit increases and other actuarial experience and assumptions (**Figure 1 and 2**). The difference between actual investment performance—which averaged 6.5% annually—and an assumed rate of return that ranged from 7.75% to 8%—was the largest contributor, accounting for over $8B of the increase in unfunded liabilities.

It is important to note that PERS investment performance has been comparable to, and generally above, the median return for other public pension funds. However, the impact of the historical shortfall between actual and assumed rates of return help to inform the forward-looking analysis on investment risk that follows. Separately, we also note that the overall increase of $18.7B in pension debt over 20-years does include the estimated $1.3 billion impact of benefit increases adopted in the early 2000's, but not an increase in benefits from 1999.

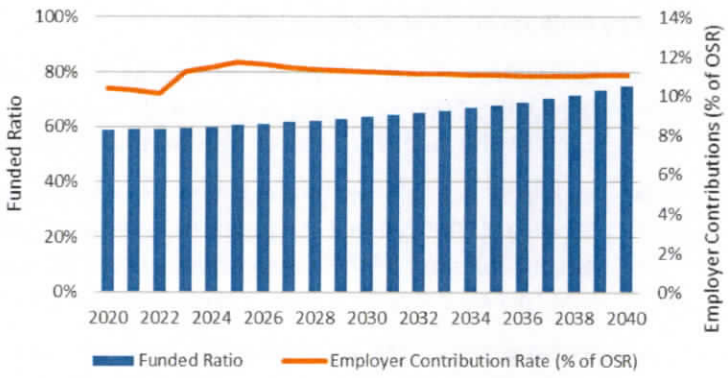
Over the same 20-year period, annual contributions from the state budget to PERS increased by over 50% as a percentage of both covered payroll and OSR **(Figure 3)**. However, since 2000, PERS' **funded ratio** fell from 90% in 2000 to 59% in 2020 and the **operating cash flow to assets ratio**, for the state, declined from 0.7% to -3.9% by 2019—more than a full percentage point below the national average as of 2019 **(Figure 4).** Pew identifies an operating cash flow of -5% or worse as an early indicator of potential fiscal distress. The deterioration of these metrics indicates that rising contributions have not fully offset underperforming investments and other sources of underfunding.

## Baseline Projections

Baseline projections in **Chart 1** show that the state's contribution rate is projected to increase to more than 11% of OSR, or 20% of payroll, over the next decade, with the ratio of employer contributions to revenue higher over the next several years due to both lower revenue resulting from the pandemic and a contribution increase called for under the board's signal light funding policy discussed in more detail in **Appendix 3** and below. These projections assume all plan assumptions are met each year, including 7.75% annual investment returns. Note that the plan's 7.75% investment return assumption is above the national average of 7.2% with only 13 state-run pension plans having a higher return target than Mississippi PERS as of 2017.

**Chart 1**

Baseline Forecast: Funded Ratio and Employer Contribution Rates




Source: The Terry Group and The Pew Charitable Trusts

## Stress Test Analysis

**Investment returns are expected to be lower than the assumed rate going forward.**

Mississippi's historical investment experience demonstrates that annual returns have fluctuated significantly, tracking closely with the up and down swings of the stock market **(Figure 5)**. Looking forward, financial experts anticipate investments will perform below historical averages over the next 10-20 years, due to the expectation that economic growth, returns on stocks, and interest rates for bonds will be lower than they have been in the past. Consistent with this outlook, we estimate long-term expected returns of 6.2% to 6.6%, based on PERS' current asset allocation, with a 70% probability of compound returns falling below the assumed rate of 7.75% over the next 20 years. These results are based on simulation analysis designed to replicate real world conditions using Pew's capital market assumptions and PERS current target asset allocations across stocks (61%), bonds and cash (21%), and alternative investments (18%).

To account for this uncertainty, the Government Accounting Standards Board (GASB) requires plans to report funding levels under a range of investment return assumptions as part of their annual reporting. The attached **Pension Risk Dashboard** presents this sensitivity analysis for PERS, along with an estimated calculation of plan liabilities at a sample municipal borrowing rate of 3% informed by proposed changes to Actuarial Standard of Practice No. 4. The purpose of these calculations is not to offer a "correct" liability measure but rather to offer measures of the level of risk being taken on by plan sponsors in targeting funding goals based on the current assumed rate of return.

**Significant increases in future contributions due to lower than expected investment returns are likely.**

To evaluate the potential impact of market volatility moving forward and calculate probabilities that certain outcomes occur, we use simulation analysis to generate thousands of forward-looking trials of possible market performance and present a range of outcomes for various financial measures **(Appendix 5).** Based on the range of employer contribution results presented in **Figure 6**, we estimate a nearly 70% probability that annual required contributions as a share of revenue will increase from the current rate of about 10% to around 12% – a 20% increase or $200 million in terms of current state OSR – over the next decade.

These projected contribution increases occur in accordance with the current funding policy, which measures success along three metrics, including an 80% funding target by 2047. This policy calls for annual increases if the three metrics falls short of pre-defined thresholds—signaled by "red lights" in plan reporting **(Table 1)**. The size of the adjustment is based on the amount required to put all measures back into the "green light" category.

**Table #1: Summary of MS PERS Signal Light Funding Policy Thresholds**

| Status | Funded Ratio in 2047 | Operating Cash Flow | ADC / Fixed Contribution Rate (FCR) |
|---|---|---|---|
| Green | Above 80% | Above -6% | At or below 100% |
| Yellow | Between 65% and 80% | Between -6% and -7.75% | Between 100% and 110% |
| Red | Below 65% | Below -7.75% | Above 110% |

**Source:** 2020 Mississippi PERS actuarial valuation, Schedule F, pages 43-48.

Scenario analysis illustrates how the signal light policy is applied under a **fixed 5% return scenario** that assumes 5% returns in each year of the forecast period and an **asset shock scenario** that consists of an initial investment loss of more than 20% over two years, followed by three years of economic recovery and lower returns of 5% over the remaining years of the projection period.

Under the asset shock scenario, the immediate investment losses trigger all three signal lights resulting in a significant contribution increase in 2024 and 2025—with employer contributions rising from 10.4% of OSR in 2020 to 17.4% of OSR in 2025. Also, contribution requirements nearly double over the entire 20-year period. In a scenario with long-term returns of 5%, while only two of the three signal lights (funded ratio and ADC) are triggered immediately, steep contribution increases do eventually become required later in the projection period **(Figure 7).**

Importantly, these findings are supported by a recent analysis by the PERS actuary which finds that contributions would need to increase even if investment returns meet expectations. As dictated by the signal light policy, the PERS board will be required to consider contribution increases of at least $150M to $200M starting in FY 2023. The range covers the required increase under current assumptions as well as projections assuming a lowering of the discount rate to meet recommendations in the 2019 experience study and anticipated similar conclusions from the upcoming experience study.

The plan actuary also contemplates a contribution rate under a 7.25% assumed rate of return which would result in an increase closer to $300M **(Table 2)**. This consideration is based on the expectation that the upcoming 2021

experience study could recommend a further reduction in the assumed rate of return, below the 7.5% recommended as part of the 2019 study.

**Table #2: Recommended Increases in the Fixed Contribution Rate**

| | Using 7.75% Assumption | Using 7.50% Assumption | Using 7.25% Assumption |
|---|---|---|---|
| Fixed Contribution Rate (FCR) | 19.60% | 20.50% | 22.25% |

**Source:** Cavanagh Macdonald. *Report on the Thirty-Year Projections of the Mississippi Retirement Systems. Prepared as of June 30, 2020.* Page 40.

**Increased funding may be necessary to prevent fiscal distress.**

Under both the fixed 5% and asset shock scenarios, the signal light policy proves effective at maintaining plan funding above 40% throughout the projection period. And although modeling investment risk is at the heart of stress testing, policymakers' responses to addressing lower returns, in terms of making annual required contributions, can also be a source of risk to plans' fiscal health. To examine the impact of contribution risk, we assess the potential impact on the pension system's funded status under the same 5% return and asset shock scenarios, assuming that policymakers do not adjust contributions as called for under the plan funding policy and instead hold them constant as a share of revenue in each year of the forecast period. We refer to this as a **revenue-constrained contribution policy** assumption.

Under this assumption, the funded ratio remains stable if the 7.75% investment assumption is achieved, falls to around 20% under 5% returns, and approaches insolvency in the asset shock scenario **(Figure 8).** Based on this assessment of contribution risk, we find that the signal light adjustments are not only effective at helping to achieve funding goals but also help preserve plan solvency in downside scenarios.

## Policy Considerations

**Based on these results, policymakers could consider several changes to improve fiscal stability.**

The results presented in the previous sections align with a recent analysis from the plan actuary that will require the board to consider contribution increases of at least $150M to $200M in FY 2023 and illustrate the risk of the potential need for further contribution increases. In particular, the results of investment risk analysis indicate that there is a 70% probability that compound investment returns fall below the current assumed rate of 7.75% over the next 20 years. Pew's research indicates that the long-term outlook for a typical public pension plan's returns over the next 20 years is likely to be between 6.0% and 6.5%, in part due to a reduction in the outlook for interest rates and bond yields triggered by the COVID-19 pandemic. As a result, we estimate that over the next decade, the state will likely need to increase annual contributions as a share of revenue by nearly 20% or more than $200 million in today's dollars.

Scenario analysis designed to measure contribution risk, moreover, indicates that increasing annual pension contributions is essential. For example, in a lower 5% return scenario, without any increase in the employer contribution rate, we estimate that PERS assets would begin to decline within two years and fall below 25% funded by 2040.

Based on these results, policymakers might also consider additional adjustments to make costs more certain, including lowering the assumed rate of return beyond the scheduled reductions that would occur if investment returns exceed expectations, simplifying the funding policy to reduce the risk of sudden contribution increases in the future, and adopting variable COLA policies or other tools to adjust benefits automatically based on investment returns and actuarial conditions. For example, a variable COLA benefit that is tied to the Consumer Price Index (CPI) has emerged as a common practice among the best run public sector retirement systems.

# Pension Risk Dashboard

Public Employees' Retirement System of Mississippi

## Sensitivity Analysis

| Investment Return Assumption | Expected 7.75% | 1% Above 8.75% | 1% Below 6.75% | Muni / Low Rate 3.00% / 5.00%* |
|---|---|---|---|---|
| **Pension Liability ($B)** | | | | |
| Market Value of Assets | 27.8 | 27.8 | 27.8 | 27.8 |
| Actuarial Accrued Liability | 47.4 | 42.6 | 53.1 | 88.2 |
| Unfunded Liability | 19.5 | 14.8 | 25.2 | 60.3 |
| Funded Ratio | 59% | 65% | 52% | 32% |
| **Normal Cost: Latest Tier (% of Payroll)** | | | | |
| Total Normal Cost | 11.1% | 9.3% | 13.5% | 20.5% |
| Employee Contribution | 9.0% | 9.0% | 9.0% | 9.0% |
| Employer Normal Cost | 2.1% | 0.3% | 4.5% | 11.5% |
| **Normal Cost: Total Workforce (% of Payroll)** | | | | |
| Total Normal Cost | 11.7% | 9.9% | 14.0% | 20.7% |
| Employee Contribution | 9.0% | 9.0% | 9.0% | 9.0% |
| Employer Normal Cost | 2.7% | 0.9% | 5.0% | 11.7% |

**3.00% is used to measure the pension liability. 3.00% is a sample municipal borrowing rate informed by proposed changes to Actuarial Standards of Practice No. 4. For normal cost, a low rate of return of 5% is used to approximate the 25th percentile of expected returns.*

## Stochastic Analysis

| Projected Investment Returns Over 10 and 20 Years | | | | | |
|---|---|---|---|---|---|
| **Percentile** | **5th** | **25th** | **50th** | **75th** | **95th** |
| 10 Years | 0.5% | 3.8% | 6.3% | 8.7% | 12.2% |
| 20 Years | 2.0% | 4.5% | 6.2% | 8.0% | 10.5% |

| Probability of Specific Events Over 10 and 20 years | Current | Probability | |
|---|---|---|---|
| **Affordability Measures** | **2020** | **2021-2030** | **2031-2040** |
| Contributions/OSR increases 4pp | 10.4% | 46% | 66% |
| Contributions/OSR increases 2pp | 10.4% | 70% | 80% |
| Contributions/Payroll increases 5pp in any single year | 17.4% | 22% | 31% |
| **Solvency Measures** | | | |
| Operating Cash Flow Ratio < -5% | -4.4% | 86% | 54% |
| Funded Ratio > 100% | 58.8% | 7% | 25% |
| Funded Ratio decreases 10pp | 58.8% | 57% | 54% |
| Funded Ratio = 0% (revenue-constrained policy)* | 58.8% | 0% | 16% |

**Revenue-constrained policy assumes employers hold contributions fixed as percentage of state own-source revenue (OSR). This same assumption is analyzed in the contribution risk section.*

## Scenario Analysis: Investment Risk

| | Reported | Projected | | |
|---|---|---|---|---|
| **Contributions (% of OSR)** | **2020** | **2025** | **2030** | **2040** |
| Baseline | 10% | 12% | 11% | 11% |
| 5% Returns | 10% | 12% | 14% | 17% |
| Asset Shock* | 10% | 17% | 16% | 20% |
| **Operating Cash Flow Ratio** | | | | |
| Baseline | -4% | -5% | -5% | -4% |
| 5% Returns | -4% | -5% | -5% | -2% |
| Asset Shock | -4% | -3% | -4% | -1% |
| **Funded Ratio** | | | | |
| Baseline | 59% | 61% | 64% | 75% |
| 5% Returns | 59% | 52% | 48% | 49% |
| Asset Shock | 59% | 45% | 44% | 49% |

**Asset shock is a hypothetical scenario with portfolio returns of -15% and -10% in 2021 and 2022, a three-year recovery beginning in 2023 with returns of 25%, 10% and 10%, and 5% returns in 2026 and beyond.*

## Scenario Analysis: Contribution Risk*

| | Reported | Projected | | |
|---|---|---|---|---|
| **Contributions (% of OSR)** | **2020** | **2025** | **2030** | **2040** |
| Baseline | 10% | 10% | 10% | 10% |
| 5% Returns | 10% | 10% | 10% | 10% |
| Asset Shock | 10% | 10% | 10% | 10% |
| **Operating Cash Flow Ratio** | | | | |
| Baseline | -4% | -5% | -6% | -5% |
| 5% Returns | -4% | -6% | -7% | -14% |
| Asset Shock | -4% | -7% | -10% | -48% |
| **Funded Ratio** | | | | |
| Baseline | 59% | 60% | 61% | 67% |
| 5% Returns | 59% | 52% | 43% | 21% |
| Asset Shock | 59% | 42% | 32% | 4% |

**Analyzes the same three investment risk scenarios with the added impact of contribution risk, represented by the risk that employers keep contributions fixed at their 2019 share of own-source revenue (OSR).*

## Figures 1-4
Public Employees' Retirement System of Mississippi

Figure 1
Historical Funded Ratio and Employer Contribution Rates

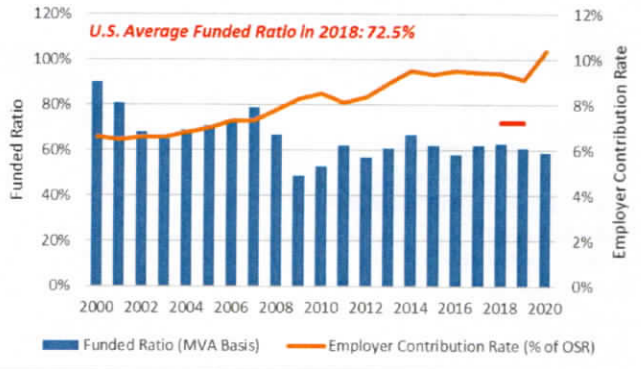



Figure 2
Change in Unfunded Liability, 2000-2020

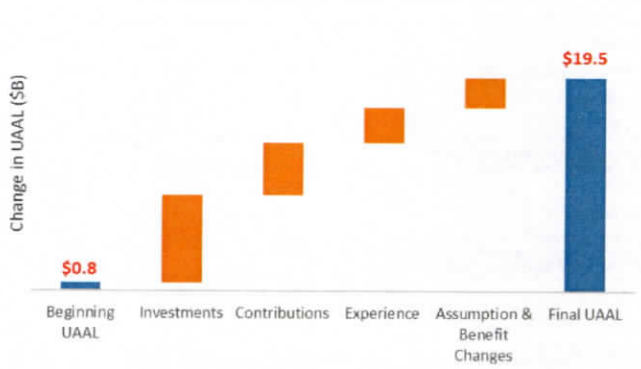



Figure 3
Historical Employer Contributions: % of Payroll and OSR

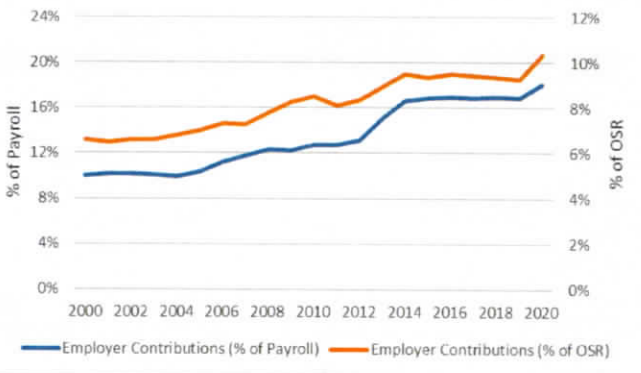
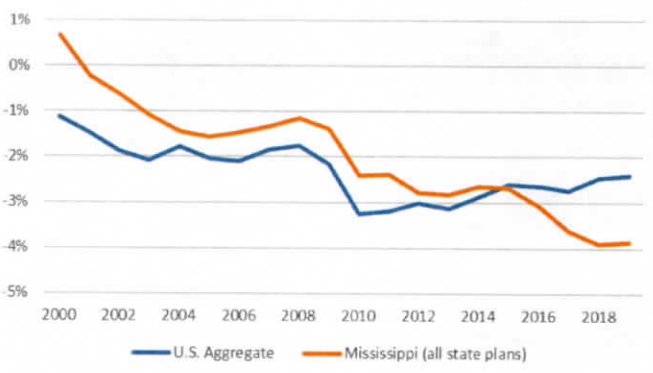



Figure 4
Historical Operating Cash Flow Ratio




Notes: Figure 4 is based on data from the U.S. Census Bureau Annual Survey of Public Pensions, which reports data at the state and local level for all 50 states but not for individual plans. As of this writing, survey results have only been published through 2019.
Sources: The Pew Charitable Trusts, U.S. Census Bureau, and Mississippi PERS comprehensive annual financial reports and actuarial valuations.

## Figures 5-8
Public Employees' Retirement System of Mississippi

**Figure 5**
Investment Market Volatility: Historical Returns vs. S&P 500

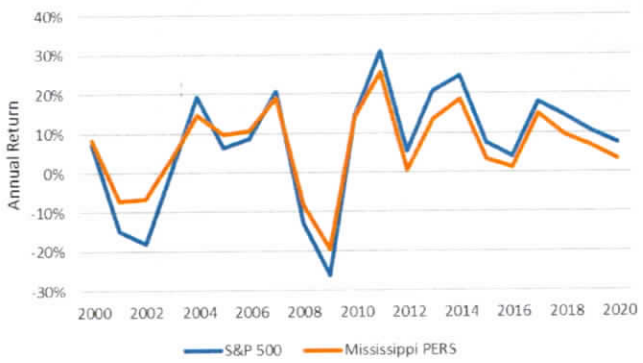



**Figure 6**
Stochastic Analysis: Employer Contribution Rates (% of OSR)

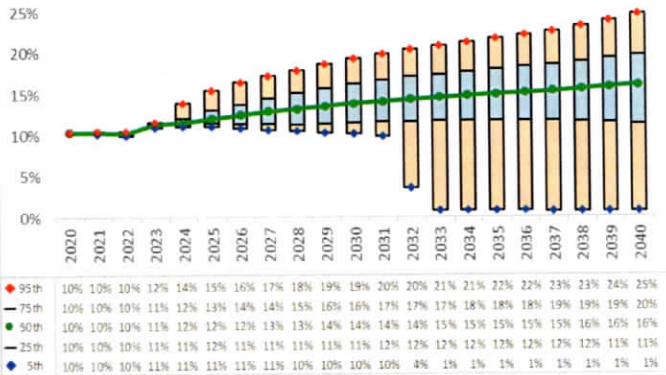



**Figure 7**
Scenario Analysis: Employer Contribution Rates (% of OSR)

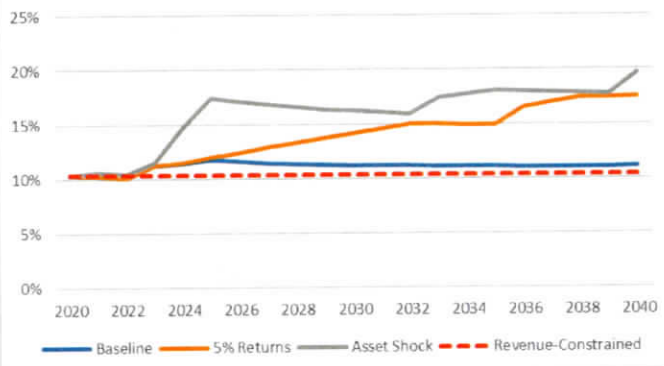
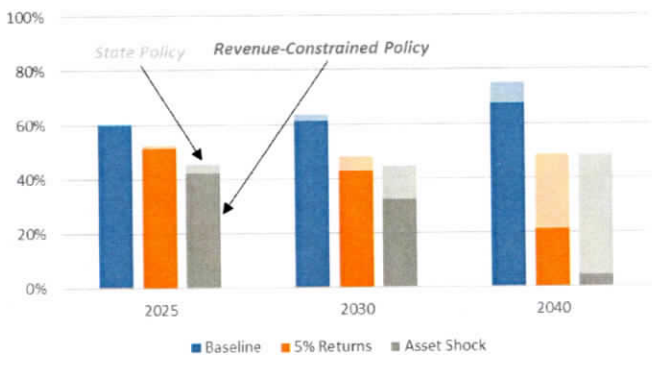



**Figure 8**
Scenario Analysis: Funded Ratio




Sources: "PERS Facts & Figures For Fiscal Year 2020", The Terry Group, and The Pew Charitable Trusts

## Appendix #1: Foundation for Public Pensions Risk Reporting 2021 Update

**Risk reporting** for public pensions should be transparent and accessible to all stakeholders and designed to inform long-term planning and decision making. First published in 2018, Pew's *Foundation for Public Pension Risk Reporting* provides a comprehensive starting point for pension stress test and risk analysis, with the government plan sponsor as the primary target audience. Building on existing actuarial projections and reporting standards, the framework is designed to assist budget decision makers and government finance officials in evaluating the impact of investment and contribution risk on government budgets, pension system balance sheets, and the cost of current benefits under a range of economic conditions.

Beginning with the 2018 framework, this update reflects the dynamic nature of stress testing analysis. Reporting standards and practices evolve over time, and the ups and downs of the national economy prompt the routine need to adjust baseline assumptions and projections. For example, the current updates reflect recently proposed changes to actuarial standards, emerging best practices of states that have adopted public risk reporting requirements, and explicitly identifies the need to account for workforce reductions in a downturn when measuring contribution risk. The supporting notes to the framework also capture revisions to our assumptions and methodology about revenue and investment returns impacted by the COVID-19 pandemic, as well as further information on risk tolerance measures as critical budget management tools to actively monitor and manage key risks during all cycles of the economy, but especially during an economic downturn and expected recovery.

Overall, risk assessment should build on existing actuarial reporting, be tailored to the individual policies and features of the pension plan, and employ forward-looking projections of at least 5-20 years and include:

1. Sensitivity analysis of plan liabilities to different investment return assumptions, including the low-default-risk obligation measure as outlined in proposed changes to Actuarial Standard of Practice (ASOP) No.4;
2. Scenario analysis to assess investment risk, using regularly updated baseline projections that account for current economic conditions, and including (a) a low return scenario assuming a fixed reduced rate of return (for example, 5% or the 25th percentile of projected returns) on assets; and (b) a downside, asset shock scenario that includes an initial loss of 20% on plan investments, followed by a period of recovery, and then low returns over the remaining period.[i]
3. To assess contribution risk, projections and measurements for modified versions of the scenarios above, assuming (a) full actuarial contributions based on current funding policies; and (b) contributions that are constrained by the rate of revenue growth (i.e. fixed as a percent of revenue). Projections of plan contributions in these scenarios should account for any impact of recession-related payroll reductions, particularly for plans with fixed-rate funding policies;
4. Projections using stochastic analysis to simulate the volatility of annual investment returns above and below the expected rate of return, in order to measure the range of possible contributions and financial positions over the forward-looking projection period; and
5. Sensitivity analysis of service costs for current benefits, under the latest tier and the entire population as a whole, to different investment return assumptions.

[i] See notes for details of how Pew incorporates the impact of the pandemic into developing baseline and downside scenarios, including use of the assumptions published by the Federal Reserve Board for its annual bank stress tests.

To date, 12 states have enacted statutory requirements for risk reporting targeted to government plan sponsors.[ii] Legislation in these states establishes the scope of analysis and reporting, as well as the process for submitting the results to policymakers.

The resulting metrics provide executive and legislative officials information that supports active monitoring of risk and measures of risk tolerance, a data-driven approach to long-term budgeting through all cycles of the economy, and a framework to evaluate the impact of proposed or adopted policy changes.

[ii] As of November 2020, 12 states have enacted statutory requirements for routine risk reporting: Since 2017 alone, 10 states have adopted requirements through legislation, including: Virginia (2017), Hawaii (2017), Connecticut (2017), New Jersey (2018), Colorado (2018), Maryland (2018), Indiana (2019), Montana (2019), North Carolina (2020), and Pennsylvania (2020) joining early adopters Washington state (2007) and California (2011).

## Appendix #2: Summary of 50-State Data

### Table 1: Funding and Contributions (2018)

| | Mississippi PERS | 50 state Rank | National Average | Comments |
|---|---|---|---|---|
| **Funded Ratio** | 63% | 39th | 72.5% | In 2000, MS was 90% funded. |
| **Net Amortization /Payroll** | -5.7% | 41st | -1.8% | Plans with negative amortization will see pension debt rise even if all plan assumptions are achieved. |
| **Operating Cash Flow/Assets** | -4.38% | 42nd | -3.0% | Pew considers operating cash flow below -5% as indicator of risk of future fiscal distress. Signal light policy recommends contribution increases at -7.75%. |

**Notes:** Net amortization is calculated as the difference between contributions and service cost plus interest on the existing pension debt and is presented as a percentage of payroll to provide a comparable snapshot of whether contribution payments are adequate to reduce pension debt. Operating cash flow to assets provides a benchmark for a rate of return to ensure asset balances do not decrease.
**Sources:** Comprehensive annual financial reports, actuarial reports and valuations, or other public documents, or as provided by plan.

### Table 2: Investments (2017)

| | Mississippi PERS | National Average | Comments |
|---|---|---|---|
| **Asset Allocation** | 63% Equity<br>20% Fixed income<br>17% Alternatives | 49% Equity<br>25% Fixed income<br>26% Alternatives | National allocation to alternatives increased from 11% in 2006 to 26% in 2017. |
| **10-year Performance (2020)** | 9.44% | 8.64% | Returns are gross of fees. National average based on TUCs research which is also gross of fees. |
| **Fees** | 36 basis points | 41 basis points | MS is near the median in terms of investment fees for the 73 state pension funds Pew tracks, as of 2017 data. |
| **Assumed Rate of Return** | 7.75% | 7.24% | Only 13 states had a higher assumed rate of return in 2017. National average has declined from 8% in 2007 to 7.24% in 2017. |

**Notes:** Pew tracks performance metrics and asset allocation policies for 73 state pension funds.
**Sources:** Comprehensive annual financial reports, actuarial reports and valuations, or other public documents, or as provided by plan. National investment data from the Wilshire Trust Universe Comparison Service (TUCS).

## Table 3: Current Plan Design

| | Mississippi PERS (Tier 4) | Comments |
|---|---|---|
| **Plan Type** | Defined Benefit | Final average salary defined benefit plans remain the most common for state workers. Alternative plan designs – such as hybrid plans – are used in 17 states as either the primary plan or default option for participating state employees/teachers. |
| **Benefit Multiplier** | 2%: up to 30 YOS<br>2.5%: > 30 YOS | 1.8% national average for final average salary DB plans that participate in Social Security. |
| **COLA** | 3%, automatic | Around 60% of state and teacher plans that participate in Social Security offer an automatic COLA while another 25% provide them on an ad-hoc basis. Among the automatic COLAs, more than half are tied to CPI. |
| **Employee Contribution** | 9% | General state employee members contribute to the plan at a higher rate than the national average of 6.6%. |
| **Social Security** | Yes | MS PERS is one of 64 state and teacher plans that participate in Social Security. 19 state and teacher plans don't participate. |
| **Cost Sharing Features** | None | 17 states utilize defined benefit cost sharing features that automatically adjust contributions or benefits |

**Notes:** For the purpose of comparing plan designs in this table, we've considered the most recent benefit tier. For purposes of actuarial modeling, Pew projections incorporate all benefit tiers.
**Source:** Pew analysis of the Urban Institute State and Local Employee Pension Plan (SLEPP) database; and state plan financial reporting, member handbooks, and other public documents.

## Table 4: OPEB (2016)

| | Mississippi PERS | Comments |
|---|---|---|
| **Total Liability** | $709 M | States reported a total liability of $696 billion in non-pension retirement benefits for their employees, known as other post-employment benefits (OPEB), in 2016. This figure represents a 0.4 percent increase from 2015, when states reported $692 billion in liabilities. |
| **Premium Classification** | Coverage Only | MS is one of 9 states that offer coverage to retirees but do not contribute to the premium. |
| **Liability/Personal Income** | 0.67% | National average is 4.57%. MS ranks 38th. States that provide coverage without contributions rank at the lower end of the liability scale. |
| **Participating employees** | States and Teachers | MS is one of 16 states to offer coverage to state employees and teachers. Other states limit coverage to state employees only or include local government employees. |

**Sources:** Comprehensive annual financial reports, actuarial reports and valuations, or other public documents, or as provided by plan.

## Appendix #3: Mississippi PERS Funding Policy

The Mississippi PERS funding policy sets the overall funding goals and objectives for the system and establishes a "Signal Light" approach that is used to determine the adequacy of employer contributions and measure progress toward achieving those goals. The policy stipulates that three Signal Light metrics be measured each year and documented in a projection report on a scale ranging from green (passing grade) to yellow (warning) to red (failing grade).[1] The plan's three metrics are:

1. Projected funded ratio in 2047
2. Cash flow as a percentage of assets throughout the forecast period
3. Actuarially determined contribution rate (ADC) as a ratio of the Fixed Contribution Rate (FCR)

The 2047 funded ratio metric analyzes the projected funded ratio for the plan in 2047 based on the latest valuation results. The cash flow metric assesses the system's worst projected cash flow ratio over the entire forecast period. The contribution ratio metric is measured on a "point-in-time" basis using the latest valuation. The signal light definitions for each metric are as follows:

**Table 1: Summary of MS PERS Signal Light Funding Policy Thresholds**

| Status | Funded Ratio in 2047 | Operating Cash Flow | ADC / Fixed Contribution Rate (FCR) |
|---|---|---|---|
| Green | Above 80% | Above -6% | At or below 100% |
| Yellow | Between 65% and 80% | Between -6% and -7.75% | Between 100% and 110% |
| Red | Below 65% | Below -7.75% | Above 110% |

According to the policy, if any of the three metrics results in a red signal light, the actuary "will determine and recommend to the Board an employer contribution rate increase to consider that is sufficient enough to get all three metrics back in the Green Signal Light status." If the Board accepts the recommendation, the contribution increase will take effect the July 1st 18 months following the completion of the projection report (e.g., if the 2020 projection report recommends a contribution increase—which it does—if accepted it would become effective in the fiscal year beginning July 1, 2022).

Because the policy is relatively new, there is limited experience implementing it. As a result, in modeling the plan, we were required to make several assumptions regarding how the policy would be interpreted in practice.

First, we assumed all contribution increases recommended based on the current policy would be accepted by the Board. While the Board appears to have the right to modify or decline any recommendation made by the actuary, we believed it would be most informative for plan sponsors and administrators to see plan funding progress and the course of employer contributions in simulations where the policy is followed exactly as designed.

Second, whenever a signal light is triggered (i.e. turns red) in our model, the recommended contribution increase is scheduled to take effect with a lag, as stipulated in the Board's funding policy. Therefore, if a

signal light turns red in FY 2020, the corresponding contribution increase would be scheduled to take effect beginning FY 2023.

Finally, our model does not factor scheduled contribution increases into intervening signal light assessments. If, for example, a contribution increase was scheduled for FY 2023 (due to a red light in FY 2020), the prospective increase would not be factored into signal light assessments in FY 2021 or FY 2022. Thus, whenever a signal light turns red, it is likely to remain red for the next two years until the scheduled contribution increase actually comes into effect, triggering additional contribution increases in successive years (that is, unless high investment returns in intervening years are enough to reverse the signal light status on their own).

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[1] For more information on the board's funding policy, see Schedule F on pages 43-48 of the 2020 Mississippi PERS actuarial valuation.

## Appendix #4: Revenue Projection Method

Forecasts of future state revenues are necessary for presenting forward-looking risk metrics in relation to available state resources. We estimate Own Source Revenue (OSR) — defined as total revenues minus any revenues from intergovernmental transfers, utilities, liquor stores and insurance trusts — using three sources of data: the Census's Annual Survey of State Government Finances,[i] state-provided projected changes in general fund revenues as of December 2019 and October 2020,[ii] and Moody's January 2020 and July 2020 projections of Gross State Product (GSP).[iii] First, we observe historical OSR; second, we estimate OSR pre-pandemic; third, we project OSR post-pandemic.

Specifically, historical OSR is observed using Census data through 2018, the latest year for which Annual Survey of State Government Finances data were available (2019 data were subsequently released after Pew's stress test model was created).

For pre-COVID-19 pandemic estimates, we then use state-provided growth rates as of December 2019 for the General Fund to estimate OSR for 2019 and 2020. Finally, for each year 2020 and later, we use rates of growth in GSP, as provided by Moody's as of January 2020, to calculate how OSR was expected to grow before the COVID-19 pandemic emerged.

Based on the most recent analysis by the Congressional Budget Office,[iv] we estimate that any COVID-19-related decline in revenue will occur during 2020 and 2021, after which a subsequent recovery will span 2022 through 2025. These effects are implicitly incorporated into our OSR estimates in three ways. First, revenues for 2020 and 2021 were estimated using the state's revised revenue estimate as of October 2020, which projects that, as a result of the pandemic, Mississippi's revenue will be 3.0 percent lower than previously estimated for 2020; and 4.6 percent lower than previously estimated for 2021. Second, the Moody's projections of GSP as of July 2020, which include estimates of the impact of the COVID-19 pandemic, are used to estimate OSR growth in the years after 2025. Third, the estimated revenues for 2022 to 2025 were calculated based on the historical relationship between revenue and GSP during past recoveries.

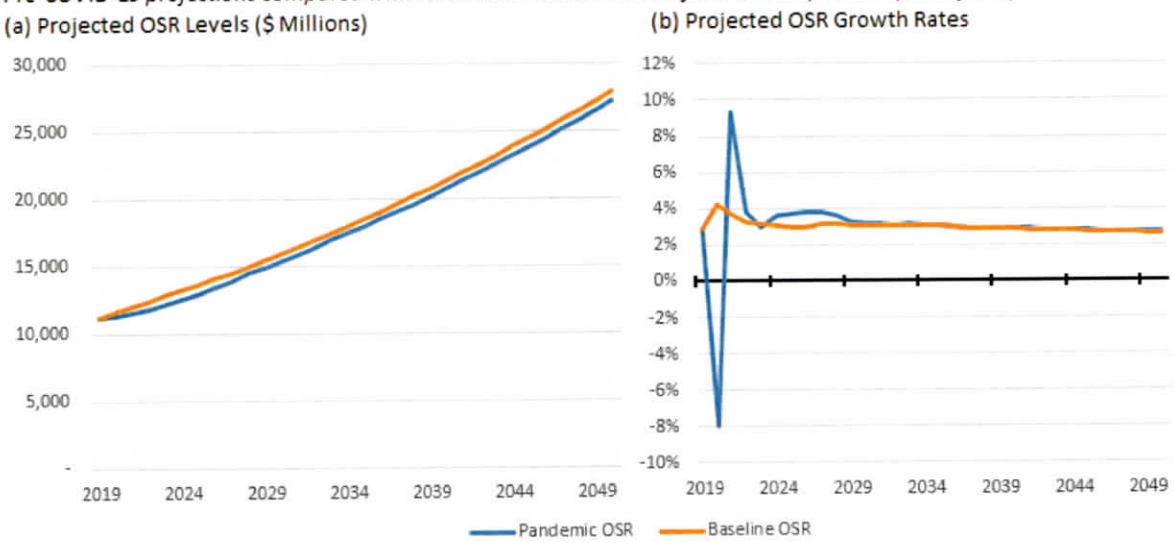
We estimate the relationship between GSP and OSR during the recession and recovery by using both state-provided OSR estimates and Moody's GSP growth rates. Mississippi's estimated 4.6 percent decline in revenue due to the COVID-19 pandemic in 2021 is significantly lower than Moody's forecast of a 12 percent decline in the state's GSP for that same year. However, based on past experience, we expect the ratio of revenue to GSP to return to the level experienced in 2018 by 2025.[v] We approximate this effect by using a constant 2.9 percent growth rate for OSR from 2022 to 2025, which is slower than the growth in GSP during that period, which is expected to average 3.5 percent.

Following our previous research, we continue to assume that the relationship in growth between OSR and GSP will hold over the long run. Therefore, starting in 2025, we assume OSR will grow at the same rate as projected GSP, which holds the ratio of revenue to GSP constant. Figure 1 illustrates the differences between pre- and post-pandemic projections of OSR levels and growth rates.

APPENDIX FIGURE 1

**Mississippi Own-Source Revenue (OSR)**

*Pre-COVID-19 projections compared with revenueestimates account for the anticipated impact of the pandemic*




Source: Pew analysis of Moody's and U.S. Census data

Pension contributions may be made by both state and local governments. We use OSR to estimate how projected pension costs change in relationship to available resources. In the long run, our OSR projections grow at the same rate as state GSP which is a measure of the change in total resources that state or local governments could draw revenue from.

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[i] Own Source Revenue is all revenue except for transfers from federal and local government, liquor stores, utilities, and revenue from trusts such as pension and workers compensation. Available at www.census.gov/programs-surveys/state.html.

[ii] General fund revenue. Available at http://www.lbo.ms.gov/Home/Publications.

[iii] Available at https://economy.com/.

[iv] Available at https://www.cbo.gov/publication/56351.

[v] See Chernick, H., Reimers, C., & Tennant, J. (2014). Tax Structure and Revenue Instability: The Great Recession and the States. IZA *Journal of Labor Policy*, 3, 1-22. doi.org/10.1186/2193-9004-3-3, Kodrzycki, Yolanda K. *Proceedings of the Annual Conference on Taxation*. 11/13/2014, Issue 107, preceding p1-37, McGranahan, L., & Mattoon, R.H. (2012). State Tax Revenues Over the Business Cycle: Patterns and Policy Responses. *Chicago Fed Letter*, 299, 1-4, and Stinson, T.F. (2006). Sources of Error in State Revenue Forecasts or How Can the Forecast Possibly Be So Far Off. *Journal of Public Budgeting*, Accounting & Financial Management, 18(1), 100-126. doi.org/10/1108/JBAFM-18-01-2006-B005.

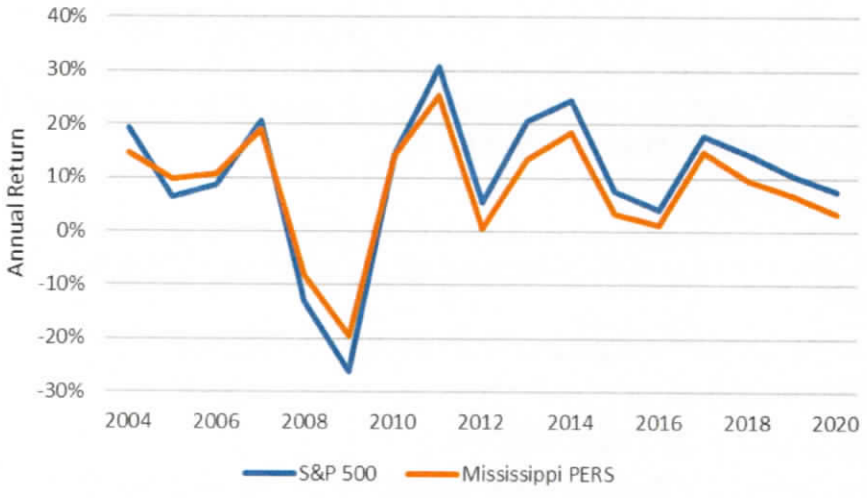
## Appendix #5: Measuring the Impact of Market Volatility through Stochastic Analysis

Investment risk can be significantly amplified when market swings are included in stress test analysis. Between 2000 and 2010, for example, two stock market corrections and recessions had the effect of lowering Mississippi's funded ratio from 90% to 53%. Volatility can also be a factor even when plan assumptions are met. While returns averaged roughly 8% between fiscal years 2012 and 2020 (i.e., since the Great Recession and recovery), they ranged from roughly 0.6% to 18.6% on an annual basis (see **Figure 1**).

This section applies stochastic analysis to assess the impact of annual fluctuations in investment returns, or market volatility.[1] By generating thousands of forward-looking trials of possible market performance, stochastic analysis allows us to evaluate the probability of various financial outcomes when annual returns are allowed to fluctuate. We specifically focus on three concepts: (1) **sequencing of returns**; (2) the **range of possible outcomes** for plan funded status; and (3) the **range of required contribution rates** (as a percentage of payroll) over a 20-year forecast period. We summarize our findings on each of these points below.

**Figure 1**

Investment Market Volatility: Historical Returns vs. S&P 500




Source: "PERS Facts & Figures for Fiscal Year 2020" and Pew analysis of Yahoo! Finance data

### Sequencing of Returns

The first takeaway from stochastic analysis is that the sequence of returns matters. Even when returns average the target rate over time, sequences in which higher returns occur first often lead to lower employer costs over time due to the impact of compounding returns. However, when lower returns occur first, it may result in a smaller asset base for investment gains later on unless offsetting increases in contributions are made. The reason is due to the combined impact of compounding returns along with negative cash flows. When lower returns occur first, it results in a smaller asset base for investment gains later on.

As an example, see **Figure 2a**, which illustrates 4 trials in which PERS could meet its investment return target over a 20-year timeframe. Each line represents a different sequence of returns, or trial, that meets the target rate of return of 7.75%. Returns fluctuate from that assumed rate annually, except for the deterministic trial, in which they are constant. In the end, the combined assumed rate of return is achieved in each case; however, as illustrated in **Figure 2b**, outcomes for required contributions vary dramatically in each trial due to differences in the sequence of returns.

**Figure 2a**
Aggregate Returns
4 Trials w/ Same 20-Year Returns

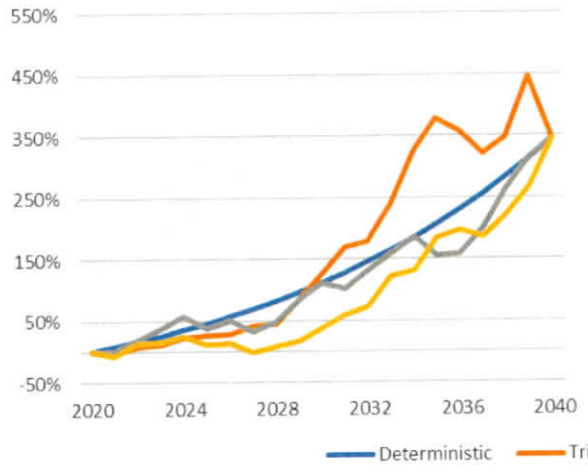
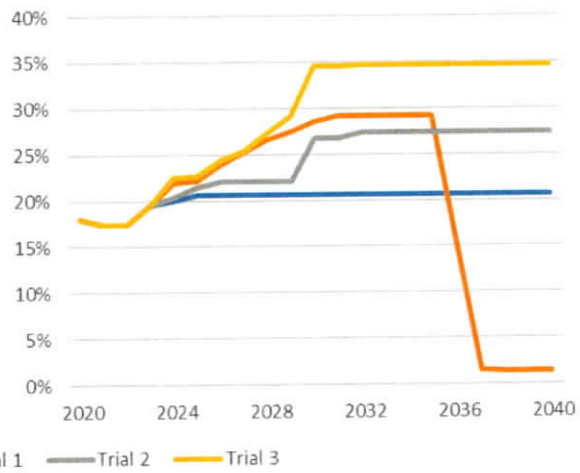



**Figure 2b**
Employer Contribution Rates (% of Payroll)
4 Trials w/ Same 20-Year Returns




Source: The Terry Group and The Pew Charitable Trusts

In Trial 3, for example, low returns in the first years of the forecast period slow initial asset growth and prompt an earlier increase in the contribution rate due to the signal light rules. Conversely, higher early returns in Trial 1 contribute to a larger-than-expected asset base, resulting in the plan reaching full funding and a dramatic drop in the employer contributions during the 20-year forecast period. In all cases, the employer contribution rate is more volatile in the stochastic simulation analysis than when using a fixed, stable rate of return.

## A Wide Range of Possible Outcomes

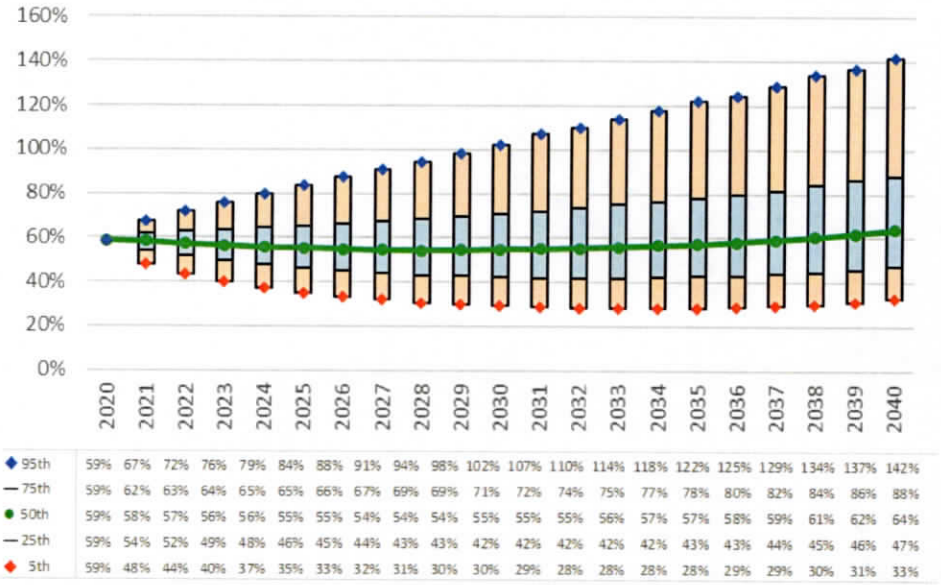
The analysis above illustrates the impact of market volatility on employer contributions using a limited set of simulations, in which 20-year returns meet the combined expected rate of return of 7.75% for PERS.

Examining the full range of 10,000 stochastic trials produced by Pew's stress test model provides a more complete picture of the **range of possible outcomes** given the impact of both short-term market volatility and long-term economic trends. **Figure 3** shows the results of that analysis on funded ratio and reinforces the assessment that the signal light policy leads to improved funding levels over time.

The green line in the figure illustrates the median outcome expected, given Pew's capital market assumptions, and shows a steady increase in the plan's funded status over time, assuming the state adheres to the signal light rules. Our capital market assumptions result in a median 20-year annualized return of 6.2% roughly 1.5% percentage points lower than the current PERS assumption.[2]

Many of the trials from our stochastic analysis show positive results – for example, in approximately 25% of scenarios we see the plan achieve full funding between 2031 and 2040 if the signal light policy is followed. However, by 2040, only slightly more than half (57%) of scenarios yield improved financial position for the plan. It is also important to note that market volatility – particularly during a downturn – may prompt higher contribution requirements that must be made if these outcomes are to be realized.

**Figure 3**
Range of Projected Funded Ratios



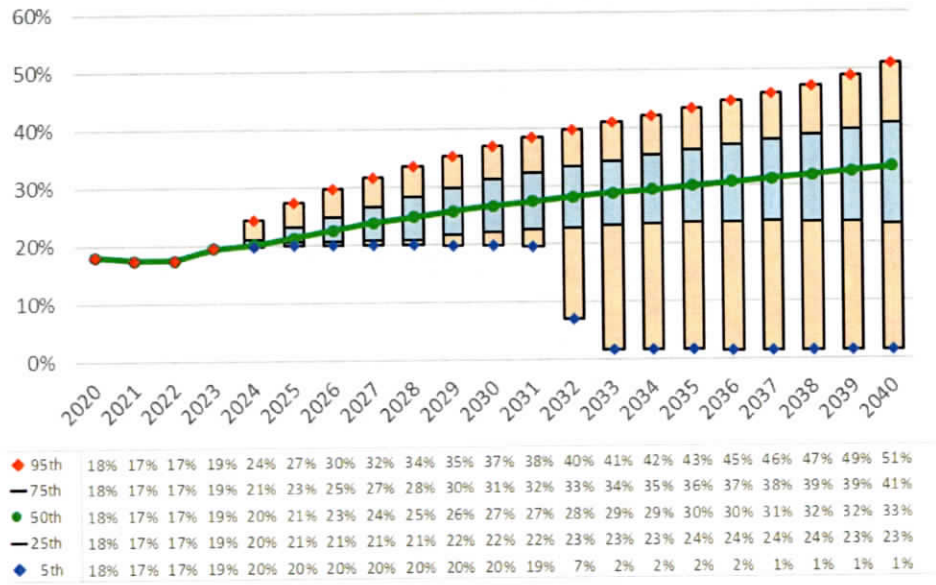

Source: The Terry Group and The Pew Charitable Trusts

## Range of Potential Required Contributions

Stochastic analysis can also be used to evaluate the budget uncertainty implicit in projections for future plan funding. **Indeed, our modeling finds a significant probability that plan costs edge higher over the next 20 years.**

For example, **Figure 4** illustrates the estimated range of projected required contributions over the 20-year forecast period given the same market volatility and economic cycles examined above. The median outcome, according to our modeling, is that contributions rise by more than 10% of payroll, to 33%, over the next 20 years. Moreover, we find a meaningful probability of more extreme increases in contributions becoming required. **Figure 4**, for example, shows there is a greater than 25% probability that employer contributions rise to 40% of payroll or more by 2040, and a 6% chance they eclipse 50% over the same timeframe.

**Figure 4**
Range of Projected Employer Contribution Rates (% of Payroll)




| | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 95th | 18% | 17% | 17% | 19% | 24% | 27% | 30% | 32% | 34% | 35% | 37% | 38% | 40% | 41% | 42% | 43% | 45% | 46% | 47% | 49% | 51% |
| 75th | 18% | 17% | 17% | 19% | 21% | 23% | 25% | 27% | 28% | 30% | 31% | 32% | 33% | 34% | 35% | 36% | 37% | 38% | 39% | 39% | 41% |
| 50th | 18% | 17% | 17% | 19% | 20% | 21% | 23% | 24% | 25% | 26% | 27% | 27% | 28% | 29% | 29% | 30% | 30% | 31% | 32% | 32% | 33% |
| 25th | 18% | 17% | 17% | 19% | 20% | 21% | 21% | 21% | 21% | 22% | 22% | 22% | 23% | 23% | 23% | 24% | 24% | 24% | 24% | 23% | 23% |
| 5th | 18% | 17% | 17% | 19% | 20% | 20% | 20% | 20% | 20% | 20% | 20% | 19% | 7% | 2% | 2% | 2% | 2% | 1% | 1% | 1% | 1% |

Source: The Terry Group and The Pew Charitable Trusts

[1] Stochastic simulations are used in Pew's stress test analysis to model the probabilities of various financial outcomes given specified means and standard deviations of economic variables and market returns. Our stress test model generates 10,000 runs for each simulation, which yields a distribution of investment returns for each year. For more information, see: Mennis, Greg, Susan Banta and David Draine. (2018). Assessing the Risk of Fiscal Distress for Public Pensions: State Stress Test Analysis. Mossavar-Rahmani Center for Business and Government Working Paper Series, no. 92. Available at https://www.hks.harvard.edu/sites/default/files/centers/mrcbg/files/AWP_92_final.pdf.

[2] For a detailed description of Pew's capital market assumptions, see Mennis et al. (2018).

## Appendix #6: Stress Test Model Output

| Exhibit | Plan(s) Included | Description |
|---|---|---|
| 1 | PERS | 30-year projections: expected (7.75%) returns, state contribution policy |
| 2 | PERS | 30-year projections: fixed 5% returns scenario, state contribution policy |
| 3 | PERS | 30-year projections: asset shock scenario, state contribution policy |
| 4 | PERS | 30-year projections: expected (7.75%) returns, revenue-constrained contribution policy |
| 5 | PERS | 30-year projections: fixed 5% returns scenario, revenue-constrained contribution policy |
| 6 | PERS | 30-year projections: asset shock, revenue-constrained contribution policy |
| 7 | PERS | Comparison of key fiscal metrics at 5-, 10-, and 20-year intervals across all scenarios and stochastic trials |

**Notes and Disclosures**

The information in this report is based on the valuation results of the Public Employees' Retirement System (PERS) of Mississippi as of June 30, 2020. Projections are based on a roll-forward model using publicly available actuarial data and assumptions.

**Exhibit 1**

## Mississippi Retirement System 30-Year Projections

Plans included: Public Employees' Retirement System (PERS)
State contribution policy at assumed return (7.75%)

$MMs

| | Pension Liability (Actuarial Accrued Liability) | | | | | | Pension Assets (Market Value) | | | | | | Change in Pension Debt | | | Cash Flow | Employer Contribution | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fiscal Year | Payroll | Beginning of Period | Service Cost | Interest | Benefit Payments | End of Period | Beginning of Period | Total Contribution | Interest | Benefit Payments | End of Period | Pension Debt | $ | % of Payroll | % Funded | % of Assets | $ | % Change | % Payroll |
| 2021 | 6,818 | 47,354 | 692 | 3,584 | (3,093) | 48,537 | 27,827 | 1,800 | 2,095 | (3,093) | 28,630 | 19,907 | 380 | 6% | 59% | -5% | 1,186 | 1% | 17% |
| 2022 | 6,908 | 48,537 | 698 | 3,670 | (3,235) | 49,670 | 28,630 | 1,824 | 2,153 | (3,235) | 29,371 | 20,299 | 392 | 6% | 59% | -5% | 1,202 | 1% | 17% |
| 2023 | 7,046 | 49,670 | 709 | 3,754 | (3,370) | 50,762 | 29,371 | 2,008 | 2,212 | (3,370) | 30,220 | 20,542 | 243 | 3% | 60% | -5% | 1,373 | 14% | 19% |
| 2024 | 7,197 | 50,762 | 721 | 3,834 | (3,501) | 51,815 | 30,220 | 2,086 | 2,276 | (3,501) | 31,081 | 20,734 | 192 | 3% | 60% | -5% | 1,439 | 5% | 20% |
| **2025** | **7,365** | **51,815** | **734** | **3,913** | **(3,592)** | **52,871** | **31,081** | **2,179** | **2,342** | **(3,592)** | **32,011** | **20,860** | **126** | **2%** | **61%** | **-5%** | **1,516** | **5%** | **21%** |
| 2026 | 7,546 | 52,871 | 750 | 3,991 | (3,718) | 53,894 | 32,011 | 2,232 | 2,411 | (3,718) | 32,937 | 20,957 | 97 | 1% | 61% | -5% | 1,553 | 2% | 21% |
| 2027 | 7,740 | 53,894 | 766 | 4,066 | (3,844) | 54,881 | 32,937 | 2,290 | 2,480 | (3,844) | 33,862 | 21,019 | 62 | 1% | 62% | -5% | 1,593 | 3% | 21% |
| 2028 | 7,943 | 54,881 | 784 | 4,139 | (3,970) | 55,834 | 33,862 | 2,350 | 2,549 | (3,970) | 34,791 | 21,043 | 23 | 0% | 62% | -5% | 1,635 | 3% | 21% |
| 2029 | 8,156 | 55,834 | 802 | 4,208 | (4,102) | 56,742 | 34,791 | 2,412 | 2,618 | (4,102) | 35,720 | 21,022 | (20) | 0% | 63% | -5% | 1,678 | 3% | 21% |
| **2030** | **8,380** | **56,742** | **822** | **4,275** | **(4,224)** | **57,615** | **35,720** | **2,479** | **2,688** | **(4,224)** | **36,662** | **20,953** | **(70)** | **-1%** | **64%** | **-5%** | **1,725** | **3%** | **21%** |
| 2031 | 8,611 | 57,615 | 842 | 4,339 | (4,345) | 58,451 | 36,662 | 2,547 | 2,758 | (4,345) | 37,622 | 20,829 | (124) | -1% | 64% | -5% | 1,772 | 3% | 21% |
| 2032 | 8,850 | 58,451 | 864 | 4,400 | (4,462) | 59,253 | 37,622 | 2,618 | 2,830 | (4,462) | 38,608 | 20,645 | (184) | -2% | 65% | -5% | 1,821 | 3% | 21% |
| 2033 | 9,098 | 59,253 | 886 | 4,459 | (4,577) | 60,022 | 38,608 | 2,691 | 2,905 | (4,577) | 39,627 | 20,394 | (251) | -3% | 66% | -5% | 1,872 | 3% | 21% |
| 2034 | 9,356 | 60,022 | 910 | 4,516 | (4,689) | 60,759 | 39,627 | 2,767 | 2,982 | (4,689) | 40,688 | 20,070 | (324) | -3% | 67% | -5% | 1,925 | 3% | 21% |
| **2035** | **9,622** | **60,759** | **935** | **4,570** | **(4,795)** | **61,467** | **40,688** | **2,846** | **3,063** | **(4,795)** | **41,802** | **19,666** | **(405)** | **-4%** | **68%** | **-5%** | **1,980** | **3%** | **21%** |
| 2036 | 9,899 | 61,467 | 960 | 4,622 | (4,896) | 62,153 | 41,802 | 2,928 | 3,148 | (4,896) | 42,982 | 19,172 | (494) | -5% | 69% | -5% | 2,037 | 3% | 21% |
| 2037 | 10,186 | 62,153 | 987 | 4,673 | (4,991) | 62,822 | 42,982 | 3,013 | 3,238 | (4,991) | 44,241 | 18,580 | (592) | -6% | 70% | -5% | 2,096 | 3% | 21% |
| 2038 | 10,486 | 62,822 | 1,015 | 4,722 | (5,079) | 63,481 | 44,241 | 3,102 | 3,335 | (5,079) | 45,600 | 17,881 | (699) | -7% | 72% | -4% | 2,158 | 3% | 21% |
| 2039 | 10,798 | 63,481 | 1,045 | 4,772 | (5,155) | 64,142 | 45,600 | 3,194 | 3,441 | (5,155) | 47,079 | 17,063 | (818) | -8% | 73% | -4% | 2,222 | 3% | 21% |
| **2040** | **11,122** | **64,142** | **1,075** | **4,822** | **(5,223)** | **64,816** | **47,079** | **3,290** | **3,556** | **(5,223)** | **48,702** | **16,114** | **(948)** | **-9%** | **75%** | **-4%** | **2,289** | **3%** | **21%** |
| 2041 | 11,457 | 64,816 | 1,107 | 4,873 | (5,283) | 65,513 | 48,702 | 3,389 | 3,682 | (5,283) | 50,490 | 15,024 | (1,091) | -10% | 77% | -4% | 2,358 | 3% | 21% |
| 2042 | 11,804 | 65,513 | 1,141 | 4,926 | (5,337) | 66,243 | 50,490 | 3,492 | 3,822 | (5,337) | 52,466 | 13,777 | (1,246) | -11% | 79% | -4% | 2,429 | 3% | 21% |
| 2043 | 12,160 | 66,243 | 1,175 | 4,982 | (5,390) | 67,010 | 52,466 | 3,850 | 3,986 | (5,390) | 54,911 | 12,099 | (1,678) | -14% | 82% | -3% | 2,755 | 13% | 23% |
| 2044 | 12,527 | 67,010 | 1,210 | 5,041 | (5,438) | 67,824 | 54,911 | 3,977 | 4,177 | (5,438) | 57,627 | 10,196 | (1,903) | -15% | 85% | -3% | 2,850 | 3% | 23% |
| **2045** | **12,905** | **67,824** | **1,247** | **5,104** | **(5,485)** | **68,689** | **57,627** | **4,110** | **4,390** | **(5,485)** | **60,642** | **8,047** | **(2,149)** | **-17%** | **88%** | **-2%** | **2,949** | **3%** | **23%** |
| 2046 | 13,294 | 68,689 | 1,285 | 5,171 | (5,531) | 69,614 | 60,642 | 4,234 | 4,626 | (5,531) | 63,972 | 5,642 | (2,404) | -18% | 92% | -2% | 3,038 | 3% | 23% |
| 2047 | 13,695 | 69,614 | 1,324 | 5,242 | (5,578) | 70,602 | 63,972 | 4,362 | 4,886 | (5,578) | 67,641 | 2,961 | (2,682) | -20% | 96% | -2% | 3,129 | 3% | 23% |
| 2048 | 14,108 | 70,602 | 1,364 | 5,319 | (5,623) | 71,662 | 67,641 | 4,493 | 5,173 | (5,623) | 71,684 | (22) | (2,983) | -21% | 100% | -2% | 3,224 | 3% | 23% |
| 2049 | 14,535 | 71,662 | 1,406 | 5,401 | (5,667) | 72,802 | 71,684 | 1,442 | 5,367 | (5,667) | 72,826 | (24) | (2) | 0% | 100% | -6% | 133 | -96% | 1% |
| **2050** | **14,975** | **72,802** | **1,450** | **5,489** | **(5,712)** | **74,029** | **72,826** | **1,486** | **5,455** | **(5,712)** | **74,055** | **(26)** | **(2)** | **0%** | **100%** | **-6%** | **138** | **4%** | **1%** |

**Exhibit 2**

## Mississippi Retirement System 30-Year Projections

Plans included: Public Employees' Retirement System (PERS)
State contribution policy at low (5%) returns

$MMs

| | Pension Liability (Actuarial Accrued Liability) | | | | | | Pension Assets (Market Value) | | | | | | Change in Pension Debt | | | Cash Flow | Employer Contribution | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fiscal Year | Payroll | Beginning of Period | Service Cost | Interest | Benefit Payments | End of Period | Beginning of Period | Total Contribution | Interest | Benefit Payments | End of Period | Pension Debt | $ | % of Payroll | % Funded | % of Assets | $ | % Change | % Payroll |
| 2021 | 6,818 | 47,354 | 692 | 3,584 | (3,093) | 48,537 | 27,827 | 1,800 | 1,346 | (3,093) | 27,880 | 20,657 | 1,130 | 17% | 57% | -5% | 1,186 | 1% | 17% |
| 2022 | 6,908 | 48,537 | 698 | 3,670 | (3,235) | 49,670 | 27,880 | 1,824 | 1,345 | (3,235) | 27,814 | 21,856 | 1,199 | 17% | 56% | -5% | 1,202 | 1% | 17% |
| 2023 | 7,046 | 49,670 | 709 | 3,754 | (3,370) | 50,762 | 27,814 | 2,008 | 1,343 | (3,370) | 27,794 | 22,968 | 1,112 | 16% | 55% | -5% | 1,373 | 14% | 19% |
| 2024 | 7,197 | 50,762 | 721 | 3,834 | (3,501) | 51,815 | 27,794 | 2,097 | 1,341 | (3,501) | 27,731 | 24,084 | 1,117 | 16% | 54% | -5% | 1,449 | 6% | 20% |
| **2025** | **7,365** | **51,815** | **734** | **3,913** | **(3,592)** | **52,871** | **27,731** | **2,216** | **1,338** | **(3,592)** | **27,693** | **25,178** | **1,093** | **15%** | **52%** | **-5%** | **1,553** | **7%** | **21%** |
| 2026 | 7,546 | 52,871 | 750 | 3,991 | (3,718) | 53,894 | 27,693 | 2,351 | 1,336 | (3,718) | 27,663 | 26,230 | 1,053 | 14% | 51% | -5% | 1,672 | 8% | 22% |
| 2027 | 7,740 | 53,894 | 766 | 4,066 | (3,844) | 54,881 | 27,663 | 2,498 | 1,335 | (3,844) | 27,652 | 27,230 | 1,000 | 13% | 50% | -5% | 1,801 | 8% | 23% |
| 2028 | 7,943 | 54,881 | 784 | 4,139 | (3,970) | 55,834 | 27,652 | 2,641 | 1,334 | (3,970) | 27,657 | 28,177 | 947 | 12% | 50% | -5% | 1,926 | 7% | 24% |
| 2029 | 8,156 | 55,834 | 802 | 4,208 | (4,102) | 56,742 | 27,657 | 2,788 | 1,334 | (4,102) | 27,677 | 29,065 | 888 | 11% | 49% | -5% | 2,054 | 7% | 25% |
| **2030** | **8,380** | **56,742** | **822** | **4,275** | **(4,224)** | **57,615** | **27,677** | **2,939** | **1,336** | **(4,224)** | **27,727** | **29,887** | **822** | **10%** | **48%** | **-5%** | **2,185** | **6%** | **26%** |
| 2031 | 8,611 | 57,615 | 842 | 4,339 | (4,345) | 58,451 | 27,727 | 3,094 | 1,339 | (4,345) | 27,815 | 30,636 | 749 | 9% | 48% | -5% | 2,319 | 6% | 27% |
| 2032 | 8,850 | 58,451 | 864 | 4,400 | (4,462) | 59,253 | 27,815 | 3,252 | 1,343 | (4,462) | 27,948 | 31,306 | 669 | 8% | 47% | -4% | 2,455 | 6% | 28% |
| 2033 | 9,098 | 59,253 | 886 | 4,459 | (4,577) | 60,022 | 27,948 | 3,343 | 1,349 | (4,577) | 28,062 | 31,959 | 654 | 7% | 47% | -4% | 2,524 | 3% | 28% |
| 2034 | 9,356 | 60,022 | 910 | 4,516 | (4,689) | 60,759 | 28,062 | 3,437 | 1,354 | (4,689) | 28,165 | 32,594 | 634 | 7% | 46% | -4% | 2,595 | 3% | 28% |
| **2035** | **9,622** | **60,759** | **935** | **4,570** | **(4,795)** | **61,467** | **28,165** | **3,535** | **1,358** | **(4,795)** | **28,263** | **33,205** | **611** | **6%** | **46%** | **-4%** | **2,669** | **3%** | **28%** |
| 2036 | 9,899 | 61,467 | 960 | 4,622 | (4,896) | 62,153 | 28,263 | 3,942 | 1,370 | (4,896) | 28,678 | 33,475 | 270 | 3% | 46% | -3% | 3,051 | 14% | 31% |
| 2037 | 10,186 | 62,153 | 987 | 4,673 | (4,991) | 62,822 | 28,678 | 4,139 | 1,393 | (4,991) | 29,218 | 33,603 | 128 | 1% | 47% | -3% | 3,222 | 6% | 32% |
| 2038 | 10,486 | 62,822 | 1,015 | 4,722 | (5,079) | 63,481 | 29,218 | 4,349 | 1,422 | (5,079) | 29,911 | 33,569 | (34) | 0% | 47% | -2% | 3,406 | 6% | 32% |
| 2039 | 10,798 | 63,481 | 1,045 | 4,772 | (5,155) | 64,142 | 29,911 | 4,479 | 1,457 | (5,155) | 30,692 | 33,449 | (120) | -1% | 48% | -2% | 3,507 | 3% | 32% |
| **2040** | **11,122** | **64,142** | **1,075** | **4,822** | **(5,223)** | **64,816** | **30,692** | **4,613** | **1,497** | **(5,223)** | **31,580** | **33,236** | **(214)** | **-2%** | **49%** | **-2%** | **3,612** | **3%** | **32%** |
| 2041 | 11,457 | 64,816 | 1,107 | 4,873 | (5,283) | 65,513 | 31,580 | 4,752 | 1,543 | (5,283) | 32,593 | 32,921 | (315) | -3% | 50% | -2% | 3,721 | 3% | 32% |
| 2042 | 11,804 | 65,513 | 1,141 | 4,926 | (5,337) | 66,243 | 32,593 | 4,896 | 1,595 | (5,337) | 33,747 | 32,496 | (424) | -4% | 51% | -1% | 3,834 | 3% | 32% |
| 2043 | 12,160 | 66,243 | 1,175 | 4,982 | (5,390) | 67,010 | 33,747 | 5,044 | 1,654 | (5,390) | 35,055 | 31,955 | (541) | -4% | 52% | -1% | 3,950 | 3% | 32% |
| 2044 | 12,527 | 67,010 | 1,210 | 5,041 | (5,438) | 67,824 | 35,055 | 6,386 | 1,751 | (5,438) | 37,753 | 30,070 | (1,885) | -15% | 56% | 3% | 5,259 | 33% | 42% |
| **2045** | **12,905** | **67,824** | **1,247** | **5,104** | **(5,485)** | **68,689** | **37,753** | **7,475** | **1,910** | **(5,485)** | **41,653** | **27,036** | **(3,034)** | **-24%** | **61%** | **5%** | **6,313** | **20%** | **49%** |
| 2046 | 13,294 | 68,689 | 1,285 | 5,171 | (5,531) | 69,614 | 41,653 | 9,552 | 2,155 | (5,531) | 47,828 | 21,786 | (5,251) | -39% | 69% | 10% | 8,355 | 32% | 63% |
| 2047 | 13,695 | 69,614 | 1,324 | 5,242 | (5,578) | 70,602 | 47,828 | 9,840 | 2,468 | (5,578) | 54,558 | 16,044 | (5,742) | -42% | 77% | 9% | 8,607 | 3% | 63% |
| 2048 | 14,108 | 70,602 | 1,364 | 5,319 | (5,623) | 71,662 | 54,558 | 10,137 | 2,810 | (5,623) | 61,882 | 9,780 | (6,264) | -44% | 86% | 8% | 8,867 | 3% | 63% |
| 2049 | 14,535 | 71,662 | 1,406 | 5,401 | (5,667) | 72,802 | 61,882 | 10,443 | 3,182 | (5,667) | 69,840 | 2,962 | (6,818) | -47% | 96% | 8% | 9,135 | 3% | 63% |
| **2050** | **14,975** | **72,802** | **1,450** | **5,489** | **(5,712)** | **74,029** | **69,840** | **10,760** | **3,585** | **(5,712)** | **78,473** | **(4,444)** | **(7,406)** | **-49%** | **106%** | **7%** | **9,412** | **3%** | **63%** |

**Exhibit 3**

## Mississippi Retirement System 30-Year Projections

Plans included: Public Employees' Retirement System (PERS)
State contribution policy under asset shock scenario

$MMs

| | Pension Liability (Actuarial Accrued Liability) | | | | | | Pension Assets (Market Value) | | | | | | Change in Pension Debt | | | Cash Flow | Employer Contribution | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fiscal Year | Payroll | Beginning of Period | Service Cost | Interest | Benefit Payments | End of Period | Beginning of Period | Total Contribution | Interest | Benefit Payments | End of Period | Pension Debt | $ | % of Payroll | % Funded | % of Assets | $ | % Change | % Payroll |
| 2021 | 6,818 | 47,354 | 692 | 3,584 | (3,093) | 48,537 | 27,827 | 1,800 | (4,098) | (3,093) | 22,436 | 26,101 | 6,574 | 96% | 46% | -5% | 1,186 | 1% | 17% |
| 2022 | 6,908 | 48,537 | 698 | 3,670 | (3,235) | 49,670 | 22,436 | 1,824 | (2,194) | (3,235) | 18,831 | 30,839 | 4,738 | 69% | 38% | -6% | 1,202 | 1% | 17% |
| 2023 | 7,008 | 49,670 | 705 | 4,840 | (3,370) | 51,845 | 18,831 | 1,996 | 4,544 | (3,370) | 22,001 | 29,844 | (995) | -14% | 42% | -7% | 1,366 | 14% | 19% |
| 2024 | 7,118 | 51,845 | 743 | 3,893 | (3,501) | 52,980 | 22,001 | 2,440 | 2,137 | (3,501) | 23,077 | 29,902 | 58 | 1% | 44% | -5% | 1,799 | 32% | 25% |
| **2025** | **7,244** | **52,980** | **756** | **3,967** | **(3,592)** | **54,112** | **23,077** | **2,849** | **2,260** | **(3,592)** | **24,595** | **29,517** | **(385)** | **-5%** | **45%** | **-3%** | **2,197** | **22%** | **30%** |
| 2026 | 7,382 | 54,112 | 771 | 3,916 | (3,718) | 55,080 | 24,595 | 2,902 | 1,195 | (3,718) | 24,975 | 30,106 | 589 | 8% | 45% | -3% | 2,238 | 2% | 30% |
| 2027 | 7,530 | 55,080 | 783 | 3,982 | (3,844) | 56,001 | 24,975 | 2,961 | 1,212 | (3,844) | 25,303 | 30,698 | 592 | 8% | 45% | -4% | 2,283 | 2% | 30% |
| 2028 | 7,685 | 56,001 | 797 | 4,044 | (3,970) | 56,873 | 25,303 | 3,022 | 1,227 | (3,970) | 25,582 | 31,291 | 593 | 8% | 45% | -4% | 2,330 | 2% | 30% |
| 2029 | 7,847 | 56,873 | 811 | 4,103 | (4,102) | 57,686 | 25,582 | 3,085 | 1,239 | (4,102) | 25,804 | 31,881 | 590 | 8% | 45% | -4% | 2,379 | 2% | 30% |
| **2030** | **8,018** | **57,686** | **827** | **4,158** | **(4,224)** | **58,446** | **25,804** | **3,153** | **1,248** | **(4,224)** | **25,981** | **32,465** | **583** | **7%** | **44%** | **-4%** | **2,431** | **2%** | **30%** |
| 2031 | 8,194 | 58,446 | 843 | 4,208 | (4,345) | 59,152 | 25,981 | 3,222 | 1,255 | (4,345) | 26,113 | 33,038 | 574 | 7% | 44% | -4% | 2,484 | 2% | 30% |
| 2032 | 8,375 | 59,152 | 860 | 4,255 | (4,462) | 59,804 | 26,113 | 3,293 | 1,261 | (4,462) | 26,205 | 33,599 | 561 | 7% | 44% | -4% | 2,539 | 2% | 30% |
| 2033 | 8,563 | 59,804 | 877 | 4,298 | (4,577) | 60,402 | 26,205 | 3,634 | 1,270 | (4,577) | 26,532 | 33,870 | 271 | 3% | 44% | -4% | 2,863 | 13% | 33% |
| 2034 | 8,756 | 60,402 | 895 | 4,337 | (4,689) | 60,946 | 26,532 | 3,796 | 1,288 | (4,689) | 26,927 | 34,019 | 149 | 2% | 44% | -3% | 3,008 | 5% | 34% |
| **2035** | **8,957** | **60,946** | **914** | **4,372** | **(4,795)** | **61,437** | **26,927** | **3,969** | **1,309** | **(4,795)** | **27,409** | **34,028** | **9** | **0%** | **45%** | **-3%** | **3,163** | **5%** | **35%** |
| 2036 | 9,163 | 61,437 | 934 | 4,404 | (4,896) | 61,879 | 27,409 | 4,060 | 1,332 | (4,896) | 27,905 | 33,974 | (54) | -1% | 45% | -3% | 3,236 | 2% | 35% |
| 2037 | 9,377 | 61,879 | 955 | 4,432 | (4,991) | 62,274 | 27,905 | 4,155 | 1,356 | (4,991) | 28,426 | 33,849 | (125) | -1% | 46% | -3% | 3,311 | 2% | 35% |
| 2038 | 9,600 | 62,274 | 977 | 4,457 | (5,079) | 62,629 | 28,426 | 4,254 | 1,382 | (5,079) | 28,983 | 33,647 | (202) | -2% | 46% | -3% | 3,390 | 2% | 35% |
| 2039 | 9,831 | 62,629 | 1,000 | 4,479 | (5,155) | 62,953 | 28,983 | 4,356 | 1,410 | (5,155) | 29,594 | 33,359 | (287) | -3% | 47% | -3% | 3,471 | 2% | 35% |
| **2040** | **10,071** | **62,953** | **1,024** | **4,500** | **(5,223)** | **63,254** | **29,594** | **4,867** | **1,451** | **(5,223)** | **30,690** | **32,564** | **(795)** | **-8%** | **49%** | **-1%** | **3,961** | **14%** | **39%** |
| 2041 | 10,317 | 63,254 | 1,048 | 4,520 | (5,283) | 63,539 | 30,690 | 5,079 | 1,509 | (5,283) | 31,996 | 31,544 | (1,021) | -10% | 50% | -1% | 4,151 | 5% | 40% |
| 2042 | 10,571 | 63,539 | 1,074 | 4,538 | (5,337) | 63,814 | 31,996 | 5,304 | 1,578 | (5,337) | 33,541 | 30,273 | (1,271) | -12% | 53% | 0% | 4,353 | 5% | 41% |
| 2043 | 10,830 | 63,814 | 1,100 | 4,556 | (5,390) | 64,081 | 33,541 | 5,435 | 1,657 | (5,390) | 35,243 | 28,838 | (1,435) | -13% | 55% | 0% | 4,460 | 2% | 41% |
| 2044 | 11,096 | 64,081 | 1,127 | 4,574 | (5,438) | 64,344 | 35,243 | 5,568 | 1,743 | (5,438) | 37,116 | 27,228 | (1,610) | -15% | 58% | 0% | 4,569 | 2% | 41% |
| **2045** | **11,367** | **64,344** | **1,155** | **4,592** | **(5,485)** | **64,605** | **37,116** | **5,704** | **1,839** | **(5,485)** | **39,173** | **25,431** | **(1,797)** | **-16%** | **61%** | **1%** | **4,681** | **2%** | **41%** |
| 2046 | 11,646 | 64,605 | 1,183 | 4,609 | (5,531) | 64,866 | 39,173 | 5,844 | 1,943 | (5,531) | 41,429 | 23,437 | (1,995) | -17% | 64% | 1% | 4,796 | 2% | 41% |
| 2047 | 11,931 | 64,866 | 1,213 | 4,626 | (5,578) | 65,127 | 41,429 | 5,987 | 2,058 | (5,578) | 43,896 | 21,231 | (2,206) | -18% | 67% | 1% | 4,913 | 2% | 41% |
| 2048 | 12,224 | 65,127 | 1,243 | 4,644 | (5,623) | 65,390 | 43,896 | 6,134 | 2,183 | (5,623) | 46,589 | 18,801 | (2,430) | -20% | 71% | 1% | 5,034 | 2% | 41% |
| 2049 | 12,524 | 65,390 | 1,274 | 4,662 | (5,667) | 65,659 | 46,589 | 6,285 | 2,319 | (5,667) | 49,526 | 16,133 | (2,668) | -21% | 75% | 1% | 5,157 | 2% | 41% |
| **2050** | **12,832** | **65,659** | **1,306** | **4,680** | **(5,712)** | **65,933** | **49,526** | **6,439** | **2,468** | **(5,712)** | **52,722** | **13,211** | **(2,922)** | **-23%** | **80%** | **1%** | **5,284** | **2%** | **41%** |

**Exhibit 4**

## Mississippi Retirement System 30-Year Projections

Plans included: Public Employees' Retirement System (PERS)
Revenue-constrained contribution policy at assumed return (7.75%)

$MMs

| | Pension Liability (Actuarial Accrued Liability) | | | | | | Pension Assets (Market Value) | | | | | | Change in Pension Debt | | | Cash Flow | Employer Contribution | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fiscal Year | Payroll | Beginning of Period | Service Cost | Interest | Benefit Payments | End of Period | Beginning of Period | Total Contribution | Interest | Benefit Payments | End of Period | Pension Debt | $ | % of Payroll | % Funded | % of Assets | $ | % Change | % Payroll |
| 2021 | 6,818 | 47,354 | 692 | 3,584 | (3,093) | 48,537 | 27,827 | 1,808 | 2,096 | (3,093) | 28,638 | 19,899 | 372 | 5% | 59% | -5% | 1,195 | 2% | 18% |
| 2022 | 6,908 | 48,537 | 698 | 3,670 | (3,235) | 49,670 | 28,638 | 1,851 | 2,155 | (3,235) | 29,409 | 20,261 | 363 | 5% | 59% | -5% | 1,229 | 3% | 18% |
| 2023 | 7,046 | 49,670 | 709 | 3,754 | (3,370) | 50,762 | 29,409 | 1,899 | 2,211 | (3,370) | 30,148 | 20,613 | 352 | 5% | 59% | -5% | 1,265 | 3% | 18% |
| 2024 | 7,197 | 50,762 | 721 | 3,834 | (3,501) | 51,815 | 30,148 | 1,949 | 2,265 | (3,501) | 30,862 | 20,954 | 340 | 5% | 60% | -5% | 1,302 | 3% | 18% |
| **2025** | **7,365** | **51,815** | **734** | **3,913** | **(3,592)** | **52,871** | **30,862** | **2,002** | **2,319** | **(3,592)** | **31,591** | **21,280** | **327** | **4%** | **60%** | **-5%** | **1,339** | **3%** | **18%** |
| 2026 | 7,546 | 52,871 | 750 | 3,991 | (3,718) | 53,894 | 31,591 | 2,070 | 2,373 | (3,718) | 32,316 | 21,578 | 298 | 4% | 60% | -5% | 1,391 | 4% | 18% |
| 2027 | 7,740 | 53,894 | 766 | 4,066 | (3,844) | 54,881 | 32,316 | 2,140 | 2,426 | (3,844) | 33,038 | 21,843 | 265 | 3% | 60% | -5% | 1,444 | 4% | 19% |
| 2028 | 7,943 | 54,881 | 784 | 4,139 | (3,970) | 55,834 | 33,038 | 2,211 | 2,480 | (3,970) | 33,759 | 22,074 | 231 | 3% | 60% | -5% | 1,496 | 4% | 19% |
| 2029 | 8,156 | 55,834 | 802 | 4,208 | (4,102) | 56,742 | 33,759 | 2,279 | 2,533 | (4,102) | 34,470 | 22,273 | 198 | 2% | 61% | -5% | 1,545 | 3% | 19% |
| **2030** | **8,380** | **56,742** | **822** | **4,275** | **(4,224)** | **57,615** | **34,470** | **2,348** | **2,586** | **(4,224)** | **35,179** | **22,435** | **163** | **2%** | **61%** | **-5%** | **1,594** | **3%** | **19%** |
| 2031 | 8,611 | 57,615 | 842 | 4,339 | (4,345) | 58,451 | 35,179 | 2,419 | 2,638 | (4,345) | 35,892 | 22,559 | 124 | 1% | 61% | -5% | 1,644 | 3% | 19% |
| 2032 | 8,850 | 58,451 | 864 | 4,400 | (4,462) | 59,253 | 35,892 | 2,492 | 2,692 | (4,462) | 36,613 | 22,640 | 81 | 1% | 62% | -5% | 1,695 | 3% | 19% |
| 2033 | 9,098 | 59,253 | 886 | 4,459 | (4,577) | 60,022 | 36,613 | 2,567 | 2,746 | (4,577) | 37,349 | 22,673 | 33 | 0% | 62% | -5% | 1,748 | 3% | 19% |
| 2034 | 9,356 | 60,022 | 910 | 4,516 | (4,689) | 60,759 | 37,349 | 2,644 | 2,801 | (4,689) | 38,105 | 22,654 | (19) | 0% | 63% | -5% | 1,802 | 3% | 19% |
| **2035** | **9,622** | **60,759** | **935** | **4,570** | **(4,795)** | **61,467** | **38,105** | **2,723** | **2,858** | **(4,795)** | **38,890** | **22,577** | **(77)** | **-1%** | **63%** | **-5%** | **1,857** | **3%** | **19%** |
| 2036 | 9,899 | 61,467 | 960 | 4,622 | (4,896) | 62,153 | 38,890 | 2,804 | 2,917 | (4,896) | 39,715 | 22,438 | (139) | -1% | 64% | -5% | 1,913 | 3% | 19% |
| 2037 | 10,186 | 62,153 | 987 | 4,673 | (4,991) | 62,822 | 39,715 | 2,885 | 2,980 | (4,991) | 40,590 | 22,232 | (206) | -2% | 65% | -5% | 1,969 | 3% | 19% |
| 2038 | 10,486 | 62,822 | 1,015 | 4,722 | (5,079) | 63,481 | 40,590 | 2,969 | 3,047 | (5,079) | 41,528 | 21,953 | (279) | -3% | 65% | -5% | 2,026 | 3% | 19% |
| 2039 | 10,798 | 63,481 | 1,045 | 4,772 | (5,155) | 64,142 | 41,528 | 3,056 | 3,120 | (5,155) | 42,548 | 21,593 | (359) | -3% | 66% | -5% | 2,084 | 3% | 19% |
| **2040** | **11,122** | **64,142** | **1,075** | **4,822** | **(5,223)** | **64,816** | **42,548** | **3,146** | **3,199** | **(5,223)** | **43,670** | **21,146** | **(448)** | **-4%** | **67%** | **-5%** | **2,145** | **3%** | **19%** |
| 2041 | 11,457 | 64,816 | 1,107 | 4,873 | (5,283) | 65,513 | 43,670 | 3,238 | 3,286 | (5,283) | 44,912 | 20,602 | (544) | -5% | 69% | -5% | 2,206 | 3% | 19% |
| 2042 | 11,804 | 65,513 | 1,141 | 4,926 | (5,337) | 66,243 | 44,912 | 3,331 | 3,383 | (5,337) | 46,289 | 19,954 | (648) | -5% | 70% | -4% | 2,269 | 3% | 19% |
| 2043 | 12,160 | 66,243 | 1,175 | 4,982 | (5,390) | 67,010 | 46,289 | 3,427 | 3,491 | (5,390) | 47,817 | 19,194 | (760) | -6% | 71% | -4% | 2,332 | 3% | 19% |
| 2044 | 12,527 | 67,010 | 1,210 | 5,041 | (5,438) | 67,824 | 47,817 | 3,525 | 3,610 | (5,438) | 49,514 | 18,310 | (884) | -7% | 73% | -4% | 2,398 | 3% | 19% |
| **2045** | **12,905** | **67,824** | **1,247** | **5,104** | **(5,485)** | **68,689** | **49,514** | **3,626** | **3,743** | **(5,485)** | **51,398** | **17,292** | **(1,018)** | **-8%** | **75%** | **-4%** | **2,465** | **3%** | **19%** |
| 2046 | 13,294 | 68,689 | 1,285 | 5,171 | (5,531) | 69,614 | 51,398 | 3,729 | 3,890 | (5,531) | 53,486 | 16,128 | (1,163) | -9% | 77% | -4% | 2,532 | 3% | 19% |
| 2047 | 13,695 | 69,614 | 1,324 | 5,242 | (5,578) | 70,602 | 53,486 | 3,834 | 4,053 | (5,578) | 55,794 | 14,808 | (1,321) | -10% | 79% | -3% | 2,601 | 3% | 19% |
| 2048 | 14,108 | 70,602 | 1,364 | 5,319 | (5,623) | 71,662 | 55,794 | 3,941 | 4,234 | (5,623) | 58,345 | 13,316 | (1,491) | -11% | 81% | -3% | 2,671 | 3% | 19% |
| 2049 | 14,535 | 71,662 | 1,406 | 5,401 | (5,667) | 72,802 | 58,345 | 4,051 | 4,433 | (5,667) | 61,163 | 11,640 | (1,677) | -12% | 84% | -3% | 2,743 | 3% | 19% |
| **2050** | **14,975** | **72,802** | **1,450** | **5,489** | **(5,712)** | **74,029** | **61,163** | **4,165** | **4,653** | **(5,712)** | **64,269** | **9,761** | **(1,879)** | **-13%** | **87%** | **-3%** | **2,817** | **3%** | **19%** |

**Exhibit 5**

## Mississippi Retirement System 30-Year Projections

Plans included: Public Employees' Retirement System (PERS)
Revenue-constrained contribution policy at low (5%) returns

$MMs

| | Pension Liability (Actuarial Accrued Liability) | | | | | | Pension Assets (Market Value) | | | | | | Change in Pension Debt | | | Cash Flow | Employer Contribution | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fiscal Year | Payroll | Beginning of Period | Service Cost | Interest | Benefit Payments | End of Period | Beginning of Period | Total Contribution | Interest | Benefit Payments | End of Period | Pension Debt | $ | % of Payroll | % Funded | % of Assets | $ | % Change | % Payroll |
| 2021 | 6,818 | 47,354 | 692 | 3,584 | (3,093) | 48,537 | 27,827 | 1,808 | 1,346 | (3,093) | 27,889 | 20,648 | 1,121 | 16% | 57% | -5% | 1,195 | 2% | 18% |
| 2022 | 6,908 | 48,537 | 698 | 3,670 | (3,235) | 49,670 | 27,889 | 1,851 | 1,346 | (3,235) | 27,851 | 21,819 | 1,171 | 17% | 56% | -5% | 1,229 | 3% | 18% |
| 2023 | 7,046 | 49,670 | 709 | 3,754 | (3,370) | 50,762 | 27,851 | 1,899 | 1,342 | (3,370) | 27,722 | 23,040 | 1,221 | 17% | 55% | -5% | 1,265 | 3% | 18% |
| 2024 | 7,197 | 50,762 | 721 | 3,834 | (3,501) | 51,815 | 27,722 | 1,949 | 1,334 | (3,501) | 27,503 | 24,312 | 1,272 | 18% | 53% | -6% | 1,302 | 3% | 18% |
| **2025** | **7,365** | **51,815** | **734** | **3,913** | **(3,592)** | **52,871** | **27,503** | **2,002** | **1,321** | **(3,592)** | **27,235** | **25,636** | **1,324** | **18%** | **52%** | **-6%** | **1,339** | **3%** | **18%** |
| 2026 | 7,546 | 52,871 | 750 | 3,991 | (3,718) | 53,894 | 27,235 | 2,070 | 1,306 | (3,718) | 26,894 | 27,000 | 1,364 | 18% | 50% | -6% | 1,391 | 4% | 18% |
| 2027 | 7,740 | 53,894 | 766 | 4,066 | (3,844) | 54,881 | 26,894 | 2,140 | 1,287 | (3,844) | 26,477 | 28,404 | 1,404 | 18% | 48% | -6% | 1,444 | 4% | 19% |
| 2028 | 7,943 | 54,881 | 784 | 4,139 | (3,970) | 55,834 | 26,477 | 2,211 | 1,265 | (3,970) | 25,983 | 29,850 | 1,446 | 18% | 47% | -7% | 1,496 | 4% | 19% |
| 2029 | 8,156 | 55,834 | 802 | 4,208 | (4,102) | 56,742 | 25,983 | 2,279 | 1,238 | (4,102) | 25,399 | 31,343 | 1,493 | 18% | 45% | -7% | 1,545 | 3% | 19% |
| **2030** | **8,380** | **56,742** | **822** | **4,275** | **(4,224)** | **57,615** | **25,399** | **2,348** | **1,207** | **(4,224)** | **24,730** | **32,885** | **1,541** | **18%** | **43%** | **-7%** | **1,594** | **3%** | **19%** |
| 2031 | 8,611 | 57,615 | 842 | 4,339 | (4,345) | 58,451 | 24,730 | 2,419 | 1,172 | (4,345) | 23,976 | 34,475 | 1,590 | 18% | 41% | -8% | 1,644 | 3% | 19% |
| 2032 | 8,850 | 58,451 | 864 | 4,400 | (4,462) | 59,253 | 23,976 | 2,492 | 1,133 | (4,462) | 23,139 | 36,115 | 1,640 | 19% | 39% | -8% | 1,695 | 3% | 19% |
| 2033 | 9,098 | 59,253 | 886 | 4,459 | (4,577) | 60,022 | 23,139 | 2,567 | 1,089 | (4,577) | 22,218 | 37,804 | 1,689 | 19% | 37% | -9% | 1,748 | 3% | 19% |
| 2034 | 9,356 | 60,022 | 910 | 4,516 | (4,689) | 60,759 | 22,218 | 2,644 | 1,042 | (4,689) | 21,215 | 39,543 | 1,739 | 19% | 35% | -9% | 1,802 | 3% | 19% |
| **2035** | **9,622** | **60,759** | **935** | **4,570** | **(4,795)** | **61,467** | **21,215** | **2,723** | **991** | **(4,795)** | **20,134** | **41,334** | **1,791** | **19%** | **33%** | **-10%** | **1,857** | **3%** | **19%** |
| 2036 | 9,899 | 61,467 | 960 | 4,622 | (4,896) | 62,153 | 20,134 | 2,804 | 935 | (4,896) | 18,977 | 43,177 | 1,843 | 19% | 31% | -10% | 1,913 | 3% | 19% |
| 2037 | 10,186 | 62,153 | 987 | 4,673 | (4,991) | 62,822 | 18,977 | 2,885 | 877 | (4,991) | 17,747 | 45,074 | 1,898 | 19% | 28% | -11% | 1,969 | 3% | 19% |
| 2038 | 10,486 | 62,822 | 1,015 | 4,722 | (5,079) | 63,481 | 17,747 | 2,969 | 814 | (5,079) | 16,453 | 47,028 | 1,953 | 19% | 26% | -12% | 2,026 | 3% | 19% |
| 2039 | 10,798 | 63,481 | 1,045 | 4,772 | (5,155) | 64,142 | 16,453 | 3,056 | 749 | (5,155) | 15,103 | 49,039 | 2,011 | 19% | 24% | -13% | 2,084 | 3% | 19% |
| **2040** | **11,122** | **64,142** | **1,075** | **4,822** | **(5,223)** | **64,816** | **15,103** | **3,146** | **682** | **(5,223)** | **13,708** | **51,108** | **2,069** | **19%** | **21%** | **-14%** | **2,145** | **3%** | **19%** |
| 2041 | 11,457 | 64,816 | 1,107 | 4,873 | (5,283) | 65,513 | 13,708 | 3,238 | 612 | (5,283) | 12,274 | 53,239 | 2,131 | 19% | 19% | -15% | 2,206 | 3% | 19% |
| 2042 | 11,804 | 65,513 | 1,141 | 4,926 | (5,337) | 66,243 | 12,274 | 3,331 | 540 | (5,337) | 10,809 | 55,434 | 2,195 | 19% | 16% | -16% | 2,269 | 3% | 19% |
| 2043 | 12,160 | 66,243 | 1,175 | 4,982 | (5,390) | 67,010 | 10,809 | 3,427 | 467 | (5,390) | 9,313 | 57,697 | 2,263 | 19% | 14% | -18% | 2,332 | 3% | 19% |
| 2044 | 12,527 | 67,010 | 1,210 | 5,041 | (5,438) | 67,824 | 9,313 | 3,525 | 393 | (5,438) | 7,793 | 60,031 | 2,333 | 19% | 11% | -21% | 2,398 | 3% | 19% |
| **2045** | **12,905** | **67,824** | **1,247** | **5,104** | **(5,485)** | **68,689** | **7,793** | **3,626** | **317** | **(5,485)** | **6,251** | **62,438** | **2,407** | **19%** | **9%** | **-24%** | **2,465** | **3%** | **19%** |
| 2046 | 13,294 | 68,689 | 1,285 | 5,171 | (5,531) | 69,614 | 6,251 | 3,729 | 241 | (5,531) | 4,690 | 64,924 | 2,486 | 19% | 7% | -29% | 2,532 | 3% | 19% |
| 2047 | 13,695 | 69,614 | 1,324 | 5,242 | (5,578) | 70,602 | 4,690 | 3,834 | 163 | (5,578) | 3,108 | 67,494 | 2,570 | 19% | 4% | -37% | 2,601 | 3% | 19% |
| 2048 | 14,108 | 70,602 | 1,364 | 5,319 | (5,623) | 71,662 | 3,108 | 3,941 | 85 | (5,623) | 1,510 | 70,151 | 2,658 | 19% | 2% | -54% | 2,671 | 3% | 19% |
| 2049 | 14,535 | 71,662 | 1,406 | 5,401 | (5,667) | 72,802 | 1,510 | 4,149 | 8 | (5,667) | 0 | 72,802 | 2,651 | 18% | 0% | -101% | 2,841 | 6% | 20% |
| **2050** | **14,975** | **72,802** | **1,450** | **5,489** | **(5,712)** | **74,029** | **0** | **5,742** | **(31)** | **(5,712)** | **0** | **74,029** | **1,227** | **8%** | **0%** | **N/A** | **4,394** | **55%** | **29%** |

**Exhibit 6**

## Mississippi Retirement System 30-Year Projections

Plans included: Public Employees' Retirement System (PERS)
Revenue-constrained contribution policy under asset shock scenario

$MMs

| | Pension Liability (Actuarial Accrued Liability) | | | | | | Pension Assets (Market Value) | | | | | | Change in Pension Debt | | | Cash Flow | Employer Contribution | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fiscal Year | Payroll | Beginning of Period | Service Cost | Interest | Benefit Payments | End of Period | Beginning of Period | Total Contribution | Interest | Benefit Payments | End of Period | Pension Debt | $ | % of Payroll | % Funded | % of Assets | $ | % Change | % Payroll |
| 2021 | 6,818 | 47,354 | 692 | 3,584 | (3,093) | 48,537 | 27,827 | 1,786 | (4,097) | (3,093) | 22,423 | 26,114 | 6,587 | 97% | 46% | -5% | 1,172 | 0% | 17% |
| 2022 | 6,908 | 48,537 | 698 | 3,670 | (3,235) | 49,670 | 22,423 | 1,817 | (2,192) | (3,235) | 18,813 | 30,857 | 4,744 | 69% | 38% | -6% | 1,195 | 2% | 17% |
| 2023 | 7,008 | 49,670 | 705 | 4,840 | (3,370) | 51,845 | 18,813 | 1,862 | 4,524 | (3,370) | 21,827 | 30,018 | (840) | -12% | 42% | -8% | 1,231 | 3% | 18% |
| 2024 | 7,118 | 51,845 | 743 | 3,893 | (3,501) | 52,980 | 21,827 | 1,908 | 2,094 | (3,501) | 22,329 | 30,651 | 633 | 9% | 42% | -7% | 1,268 | 3% | 18% |
| **2025** | **7,244** | **52,980** | **756** | **3,967** | **(3,592)** | **54,112** | **22,329** | **1,958** | **2,142** | **(3,592)** | **22,837** | **31,275** | **624** | **9%** | **42%** | **-7%** | **1,306** | **3%** | **18%** |
| 2026 | 7,382 | 54,112 | 771 | 3,916 | (3,718) | 55,080 | 22,837 | 2,020 | 1,085 | (3,718) | 22,225 | 32,856 | 1,581 | 21% | 40% | -7% | 1,356 | 4% | 18% |
| 2027 | 7,530 | 55,080 | 783 | 3,982 | (3,844) | 56,001 | 22,225 | 2,085 | 1,053 | (3,844) | 21,518 | 34,483 | 1,627 | 22% | 38% | -8% | 1,407 | 4% | 19% |
| 2028 | 7,685 | 56,001 | 797 | 4,044 | (3,970) | 56,873 | 21,518 | 2,150 | 1,016 | (3,970) | 20,715 | 36,158 | 1,675 | 22% | 36% | -8% | 1,459 | 4% | 19% |
| 2029 | 7,847 | 56,873 | 811 | 4,103 | (4,102) | 57,686 | 20,715 | 2,212 | 974 | (4,102) | 19,799 | 37,886 | 1,728 | 22% | 34% | -9% | 1,506 | 3% | 19% |
| **2030** | **8,018** | **57,686** | **827** | **4,158** | **(4,224)** | **58,446** | **19,799** | **2,276** | **926** | **(4,224)** | **18,777** | **39,669** | **1,782** | **22%** | **32%** | **-10%** | **1,554** | **3%** | **19%** |
| 2031 | 8,194 | 58,446 | 843 | 4,208 | (4,345) | 59,152 | 18,777 | 2,340 | 873 | (4,345) | 17,645 | 41,506 | 1,837 | 22% | 30% | -11% | 1,603 | 3% | 20% |
| 2032 | 8,375 | 59,152 | 860 | 4,255 | (4,462) | 59,804 | 17,645 | 2,406 | 815 | (4,462) | 16,405 | 43,399 | 1,893 | 23% | 27% | -12% | 1,653 | 3% | 20% |
| 2033 | 8,563 | 59,804 | 877 | 4,298 | (4,577) | 60,402 | 16,405 | 2,475 | 752 | (4,577) | 15,054 | 45,348 | 1,949 | 23% | 25% | -13% | 1,704 | 3% | 20% |
| 2034 | 8,756 | 60,402 | 895 | 4,337 | (4,689) | 60,946 | 15,054 | 2,545 | 683 | (4,689) | 13,594 | 47,352 | 2,005 | 23% | 22% | -14% | 1,757 | 3% | 20% |
| **2035** | **8,957** | **60,946** | **914** | **4,372** | **(4,795)** | **61,437** | **13,594** | **2,616** | **609** | **(4,795)** | **12,023** | **49,414** | **2,062** | **23%** | **20%** | **-16%** | **1,810** | **3%** | **20%** |
| 2036 | 9,163 | 61,437 | 934 | 4,404 | (4,896) | 61,879 | 12,023 | 2,689 | 529 | (4,896) | 10,345 | 51,534 | 2,120 | 23% | 17% | -18% | 1,865 | 3% | 20% |
| 2037 | 9,377 | 61,879 | 955 | 4,432 | (4,991) | 62,274 | 10,345 | 2,763 | 444 | (4,991) | 8,561 | 53,714 | 2,180 | 23% | 14% | -22% | 1,919 | 3% | 20% |
| 2038 | 9,600 | 62,274 | 977 | 4,457 | (5,079) | 62,629 | 8,561 | 2,839 | 354 | (5,079) | 6,675 | 55,954 | 2,241 | 23% | 11% | -26% | 1,975 | 3% | 21% |
| 2039 | 9,831 | 62,629 | 1,000 | 4,479 | (5,155) | 62,953 | 6,675 | 2,917 | 259 | (5,155) | 4,696 | 58,258 | 2,303 | 23% | 7% | -34% | 2,032 | 3% | 21% |
| **2040** | **10,071** | **62,953** | **1,024** | **4,500** | **(5,223)** | **63,254** | **4,696** | **2,997** | **160** | **(5,223)** | **2,631** | **60,624** | **2,366** | **23%** | **4%** | **-47%** | **2,091** | **3%** | **21%** |
| 2041 | 10,317 | 63,254 | 1,048 | 4,520 | (5,283) | 63,539 | 2,631 | 3,079 | 57 | (5,283) | 484 | 63,055 | 2,432 | 24% | 1% | -84% | 2,151 | 3% | 21% |
| 2042 | 10,571 | 63,539 | 1,074 | 4,538 | (5,337) | 63,814 | 484 | 4,861 | (8) | (5,337) | 0 | 63,814 | 759 | 7% | 0% | -98% | 3,910 | 82% | 37% |
| 2043 | 10,830 | 63,814 | 1,100 | 4,556 | (5,390) | 64,081 | 0 | 5,411 | (21) | (5,390) | 0 | 64,081 | 267 | 2% | 0% | N/A | 4,436 | 13% | 41% |
| 2044 | 11,096 | 64,081 | 1,127 | 4,574 | (5,438) | 64,344 | 0 | 5,460 | (21) | (5,438) | 0 | 64,344 | 263 | 2% | 0% | N/A | 4,461 | 1% | 40% |
| **2045** | **11,367** | **64,344** | **1,155** | **4,592** | **(5,485)** | **64,605** | **0** | **5,507** | **(22)** | **(5,485)** | **0** | **64,605** | **261** | **2%** | **0%** | **N/A** | **4,484** | **1%** | **39%** |
| 2046 | 11,646 | 64,605 | 1,183 | 4,609 | (5,531) | 64,866 | 0 | 5,554 | (23) | (5,531) | 0 | 64,866 | 261 | 2% | 0% | N/A | 4,505 | 0% | 39% |
| 2047 | 11,931 | 64,866 | 1,213 | 4,626 | (5,578) | 65,127 | 0 | 5,602 | (23) | (5,578) | 0 | 65,127 | 261 | 2% | 0% | N/A | 4,528 | 0% | 38% |
| 2048 | 12,224 | 65,127 | 1,243 | 4,644 | (5,623) | 65,390 | 0 | 5,647 | (24) | (5,623) | 0 | 65,390 | 263 | 2% | 0% | N/A | 4,547 | 0% | 37% |
| 2049 | 12,524 | 65,390 | 1,274 | 4,662 | (5,667) | 65,659 | 0 | 5,692 | (25) | (5,667) | 0 | 65,659 | 269 | 2% | 0% | N/A | 4,564 | 0% | 36% |
| **2050** | **12,832** | **65,659** | **1,306** | **4,680** | **(5,712)** | **65,933** | **0** | **5,737** | **(25)** | **(5,712)** | **0** | **65,933** | **274** | **2%** | **0%** | **N/A** | **4,582** | **0%** | **36%** |

## Exhibit 7

**State**
Mississippi
**Plans Included**
Public Employees' Retirement System

| | State Policy (Current Contribution Policy) | | | | | | | | | Sustainable Budget (Fixed % of OSR) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Deterministic 7.75% | | | Deterministic 5% | | | Deterministic 9% | | | Deterministic 7.75% | | | Deterministic 5% | | | Deterministic 9% | | |
| | Current Plan Assumptions | | | Low Return | | | High Return | | | Current Plan Assumptions | | | Low Return | | | High Return | | |
| Metrics | 2025 | 2030 | 2040 | 2025 | 2030 | 2040 | 2025 | 2030 | 2040 | 2025 | 2030 | 2040 | 2025 | 2030 | 2040 | 2025 | 2030 | 2040 |
| **Balance Sheet Measures** | | | | | | | | | | | | | | | | | | |
| Market Value of Assets (MVA) | 32,011 | 36,662 | 48,702 | 27,693 | 27,727 | 31,580 | 34,133 | 42,283 | 69,229 | 31,591 | 35,179 | 43,670 | 27,235 | 24,730 | 13,708 | 33,731 | 40,878 | 64,222 |
| Actuarial Accrued Liability (AAL) | 52,871 | 57,615 | 64,816 | 52,871 | 57,615 | 64,816 | 52,871 | 57,615 | 64,816 | 52,871 | 57,615 | 64,816 | 52,871 | 57,615 | 64,816 | 52,871 | 57,615 | 64,816 |
| Unfunded Actuarial Accrued Liability (UAAL) | 20,860 | 20,953 | 16,114 | 25,178 | 29,887 | 33,236 | 18,738 | 15,332 | (4,413) | 21,280 | 22,435 | 21,146 | 25,636 | 32,885 | 51,108 | 19,140 | 16,737 | 594 |
| Funded Ratio | 60.5% | 63.6% | 75.1% | 52.4% | 48.1% | 48.7% | 64.6% | 73.4% | 106.8% | 59.8% | 61.1% | 67.4% | 51.5% | 42.9% | 21.1% | 63.8% | 70.9% | 99.1% |
| AAL Compound Annual Growth Rate | 2.2% | 2.0% | 1.6% | 2.2% | 2.0% | 1.6% | 2.2% | 2.0% | 1.6% | 2.2% | 2.0% | 1.6% | 2.2% | 2.0% | 1.6% | 2.2% | 2.0% | 1.6% |
| Change in AAL from Prior Year (%) | 2.0% | 1.5% | 1.1% | 2.0% | 1.5% | 1.1% | 2.0% | 1.5% | 1.1% | 2.0% | 1.5% | 1.1% | 2.0% | 1.5% | 1.1% | 2.0% | 1.5% | 1.1% |
| | | | | | | | | | | | | | | | | | | |
| **Cash Flow Measures** | | | | | | | | | | | | | | | | | | |
| Benefit Payments | 3,592 | 4,224 | 5,223 | 3,592 | 4,224 | 5,223 | 3,592 | 4,224 | 5,223 | 3,592 | 4,224 | 5,223 | 3,592 | 4,224 | 5,223 | 3,592 | 4,224 | 5,223 |
| Total Contributions | 2,179 | 2,479 | 3,290 | 2,216 | 2,939 | 4,613 | 2,162 | 2,459 | 3,264 | 2,002 | 2,348 | 3,146 | 2,002 | 2,348 | 3,146 | 2,002 | 2,348 | 3,146 |
| Negative Operating Cash Flow | 1,413 | 1,746 | 1,933 | 1,375 | 1,286 | 609 | 1,430 | 1,765 | 1,958 | 1,589 | 1,876 | 2,077 | 1,589 | 1,876 | 2,077 | 1,589 | 1,876 | 2,077 |
| Benefit Payments / Beginning of Period MVA | 11.6% | 11.8% | 11.1% | 13.0% | 15.3% | 17.0% | 11.0% | 10.4% | 8.0% | 11.6% | 12.3% | 12.3% | 13.1% | 16.6% | 34.6% | 11.1% | 10.7% | 8.6% |
| Operating Cash Flow to Assets Ratio | -4.5% | -4.9% | -4.1% | -5.0% | -4.6% | -2.0% | -4.4% | -4.4% | -3.0% | -5.1% | -5.4% | -4.9% | -5.8% | -7.4% | -13.7% | -4.9% | -4.8% | -3.4% |
| Change in MVA from Prior Year (%) | 3.0% | 2.6% | 3.4% | -0.1% | 0.2% | 2.9% | 4.4% | 4.4% | 5.8% | 2.4% | 2.1% | 2.6% | -1.0% | -2.6% | -9.2% | 3.9% | 4.0% | 5.4% |
| Own Source Revenue (OSR) | 12,919 | 15,377 | 20,691 | 12,919 | 15,377 | 20,691 | 12,919 | 15,377 | 20,691 | 12,919 | 15,377 | 20,691 | 12,919 | 15,377 | 20,691 | 12,919 | 15,377 | 20,691 |
| OSR Compound Annual Growth Rate | 2.7% | 3.1% | 3.1% | 2.7% | 3.1% | 3.1% | 2.7% | 3.1% | 3.1% | 2.7% | 3.1% | 3.1% | 2.7% | 3.1% | 3.1% | 2.7% | 3.1% | 3.1% |
| Change in OSR from Prior Year (%) | 2.9% | 3.2% | 2.9% | 2.9% | 3.2% | 2.9% | 2.9% | 3.2% | 2.9% | 2.9% | 3.2% | 2.9% | 2.9% | 3.2% | 2.9% | 2.9% | 3.2% | 2.9% |
| Employer Contributions / OSR | 11.7% | 11.2% | 11.1% | 12.0% | 14.2% | 17.5% | 11.6% | 11.1% | 10.9% | 10.4% | 10.4% | 10.4% | 10.4% | 10.4% | 10.4% | 10.4% | 10.4% | 10.4% |
| Total Contributions / OSR | 16.9% | 16.1% | 15.9% | 17.2% | 19.1% | 22.3% | 16.7% | 16.0% | 15.8% | 15.5% | 15.3% | 15.2% | 15.5% | 15.3% | 15.2% | 15.5% | 15.3% | 15.2% |
| | | | | | | | | | | | | | | | | | | |
| **Payment and Contribution Measures** | | | | | | | | | | | | | | | | | | |
| Employer Contributions (ERC) | 1,516 | 1,725 | 2,289 | 1,553 | 2,185 | 3,612 | 1,499 | 1,705 | 2,263 | 1,339 | 1,594 | 2,145 | 1,339 | 1,594 | 2,145 | 1,339 | 1,594 | 2,145 |
| Change in ERC from Prior Year (%) | 5.4% | 2.7% | 3.0% | 7.2% | 6.4% | 3.0% | 4.6% | 2.7% | 3.0% | 2.9% | 3.2% | 2.9% | 2.9% | 3.2% | 2.9% | 2.9% | 3.2% | 2.9% |
| Employee Contributions (EEC) | 663 | 754 | 1,001 | 663 | 754 | 1,001 | 663 | 754 | 1,001 | 663 | 754 | 1,001 | 663 | 754 | 1,001 | 663 | 754 | 1,001 |
| Payroll | 7,365 | 8,380 | 11,122 | 7,365 | 8,380 | 11,122 | 7,365 | 8,380 | 11,122 | 7,365 | 8,380 | 11,122 | 7,365 | 8,380 | 11,122 | 7,365 | 8,380 | 11,122 |
| Employer Contribution / Payroll | 20.6% | 20.6% | 20.6% | 21.1% | 26.1% | 32.5% | 20.4% | 20.3% | 20.3% | 18.2% | 19.0% | 19.3% | 18.2% | 19.0% | 19.3% | 18.2% | 19.0% | 19.3% |
| Employee Contribution / Payroll | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% |
| Total Contributions / Payroll | 29.6% | 29.6% | 29.6% | 30.1% | 35.1% | 41.5% | 29.4% | 29.3% | 29.3% | 27.2% | 28.0% | 28.3% | 27.2% | 28.0% | 28.3% | 27.2% | 28.0% | 28.3% |
| Normal Cost | 734 | 822 | 1,075 | 734 | 822 | 1,075 | 734 | 822 | 1,075 | 734 | 822 | 1,075 | 734 | 822 | 1,075 | 734 | 822 | 1,075 |
| Net amortization $ | (108) | 91 | 976 | (328) | (55) | 1,080 | (0) | 441 | 2,370 | (308) | (142) | 476 | (568) | (845) | (1,651) | (183) | 234 | 1,900 |
| Net amortization $ / Payroll | -1.5% | 1.1% | 8.8% | -4.5% | -0.7% | 9.7% | 0.0% | 5.3% | 21.3% | -4.2% | -1.7% | 4.3% | -7.7% | -10.1% | -14.8% | -2.5% | 2.8% | 17.1% |
| | | | | | | | | | | | | | | | | | | |
| **Investment Performance** | | | | | | | | | | | | | | | | | | |
| Compounded Annual Growth - From Start Date | 7.75% | 7.75% | 7.75% | 5.00% | 5.00% | 5.00% | 9.00% | 9.00% | 9.00% | 7.75% | 7.75% | 7.75% | 5.00% | 5.00% | 5.00% | 9.00% | 9.00% | 9.00% |
| Compounded Annual Growth - Segments | 7.75% | 7.75% | 7.75% | 5.00% | 5.00% | 5.00% | 9.00% | 9.00% | 9.00% | 7.75% | 7.75% | 7.75% | 5.00% | 5.00% | 5.00% | 9.00% | 9.00% | 9.00% |

Note: Dollar Figures in Millions

## Exhibit 7

**State**
Mississippi
**Plans Included**
Public Employees' Retirement System

| | State Policy (Current Contribution Policy) | | | | | | | | | Sustainable Budget (Fixed % of OSR) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Stochastic Run - Baseline CMA | | | | | | | | | Stochastic Run - Baseline CMA | | | | | | | | |
| | 25th Percentile | | | 50th Percentile | | | 75th Percentile | | | 25th Percentile | | | 50th Percentile | | | 75th Percentile | | |
| Metrics | 2025 | 2030 | 2040 | 2025 | 2030 | 2040 | 2025 | 2030 | 2040 | 2025 | 2030 | 2040 | 2025 | 2030 | 2040 | 2025 | 2030 | 2040 |
| **Balance Sheet Measures** | | | | | | | | | | | | | | | | | | |
| Market Value of Assets (MVA) | 24,696 | 24,481 | 30,138 | 29,698 | 31,814 | 40,444 | 35,277 | 41,341 | 55,753 | 24,121 | 20,513 | 9,217 | 29,139 | 28,501 | 21,994 | 34,779 | 39,049 | 43,933 |
| Actuarial Accrued Liability (AAL) | 53,328 | 58,121 | 63,178 | 53,754 | 58,187 | 63,053 | 54,025 | 58,391 | 63,312 | 53,328 | 58,121 | 63,178 | 53,754 | 58,187 | 63,053 | 54,025 | 58,391 | 63,312 |
| Unfunded Actuarial Accrued Liability (UAAL) | 28,632 | 33,640 | 33,040 | 24,056 | 26,374 | 22,609 | 18,748 | 17,050 | 7,559 | 29,207 | 37,608 | 53,961 | 24,615 | 29,686 | 41,059 | 19,246 | 19,342 | 19,379 |
| Funded Ratio | 46.3% | 42.1% | 47.7% | 55.2% | 54.7% | 64.1% | 65.3% | 70.8% | 88.1% | 45.2% | 35.3% | 14.6% | 54.2% | 49.0% | 34.9% | 64.4% | 66.9% | 69.4% |
| AAL Compound Annual Growth Rate | 2.4% | 2.1% | 1.5% | 2.6% | 2.1% | 1.4% | 2.7% | 2.1% | 1.5% | 2.4% | 2.1% | 1.5% | 2.6% | 2.1% | 1.4% | 2.7% | 2.1% | 1.5% |
| Change in AAL from Prior Year (%) | 2.0% | 1.4% | 0.5% | 2.3% | 1.3% | 0.5% | 2.2% | 1.3% | 0.5% | 2.0% | 1.4% | 0.5% | 2.3% | 1.3% | 0.5% | 2.2% | 1.3% | 0.5% |
| | | | | | | | | | | | | | | | | | | |
| **Cash Flow Measures** | | | | | | | | | | | | | | | | | | |
| Benefit Payments | 3,592 | 4,224 | 5,223 | 3,592 | 4,224 | 5,223 | 3,592 | 4,224 | 5,223 | 3,592 | 4,224 | 5,223 | 3,592 | 4,224 | 5,223 | 3,592 | 4,224 | 5,223 |
| Total Contributions | 2,251 | 3,085 | 4,900 | 2,229 | 2,789 | 4,132 | 2,175 | 2,567 | 3,235 | 1,967 | 2,278 | 3,285 | 1,976 | 2,277 | 3,206 | 1,975 | 2,302 | 3,105 |
| Negative Operating Cash Flow | 1,340 | 1,139 | 323 | 1,362 | 1,435 | 1,091 | 1,417 | 1,657 | 1,988 | 1,625 | 1,946 | 1,938 | 1,615 | 1,947 | 2,017 | 1,616 | 1,923 | 2,117 |
| Benefit Payments / Beginning of Period MVA | 13.9% | 16.7% | 17.6% | 12.1% | 13.2% | 13.4% | 10.7% | 10.4% | 9.7% | 14.1% | 19.0% | 46.7% | 12.2% | 14.4% | 22.5% | 10.8% | 10.9% | 12.0% |
| Operating Cash Flow to Assets Ratio | -5.2% | -4.5% | -1.1% | -4.6% | -4.5% | -2.8% | -4.2% | -4.1% | -3.7% | -6.4% | -8.8% | -17.3% | -5.5% | -6.6% | -8.7% | -4.8% | -5.0% | -4.9% |
| Change in MVA from Prior Year (%) | -4.1% | -3.0% | 1.6% | -0.2% | -0.5% | 3.8% | 5.0% | 2.0% | 3.3% | -5.3% | -7.7% | -17.6% | -1.2% | -2.9% | -5.1% | 4.4% | 1.0% | 1.3% |
| Own Source Revenue (OSR) | 12,742 | 15,120 | 20,968 | 12,806 | 15,121 | 20,700 | 12,808 | 15,273 | 20,953 | 12,742 | 15,120 | 20,968 | 12,806 | 15,121 | 20,700 | 12,808 | 15,273 | 20,953 |
| OSR Compound Annual Growth Rate | 2.4% | 3.0% | 3.1% | 2.5% | 3.0% | 3.1% | 2.5% | 3.1% | 3.1% | 2.4% | 3.0% | 3.1% | 2.5% | 3.0% | 3.1% | 2.5% | 3.1% | 3.1% |
| Change in OSR from Prior Year (%) | 2.8% | 3.1% | 3.0% | 2.7% | 3.2% | 3.0% | 2.9% | 3.0% | 3.1% | 2.8% | 3.1% | 3.0% | 2.7% | 3.2% | 3.0% | 2.9% | 3.0% | 3.1% |
| Employer Contributions / OSR | 12.6% | 15.7% | 19.0% | 12.3% | 13.8% | 15.6% | 11.9% | 12.1% | 11.1% | 10.4% | 10.4% | 11.3% | 10.4% | 10.4% | 11.1% | 10.4% | 10.4% | 10.5% |
| Total Contributions / OSR | 17.7% | 20.4% | 23.4% | 17.4% | 18.4% | 20.0% | 17.0% | 16.8% | 15.4% | 15.4% | 15.1% | 15.7% | 15.4% | 15.1% | 15.5% | 15.4% | 15.1% | 14.8% |
| | | | | | | | | | | | | | | | | | | |
| **Payment and Contribution Measures** | | | | | | | | | | | | | | | | | | |
| Employer Contributions (ERC) | 1,605 | 2,374 | 3,985 | 1,581 | 2,080 | 3,225 | 1,528 | 1,849 | 2,320 | 1,321 | 1,567 | 2,369 | 1,328 | 1,568 | 2,298 | 1,328 | 1,583 | 2,191 |
| Change in ERC from Prior Year (%) | 9.5% | 8.0% | 5.9% | 7.3% | 4.7% | 3.8% | 5.9% | 4.0% | 2.0% | 2.8% | 3.1% | 5.4% | 2.7% | 3.2% | 5.0% | 2.9% | 3.0% | 3.9% |
| Employee Contributions (EEC) | 646 | 711 | 915 | 648 | 709 | 907 | 647 | 718 | 915 | 646 | 711 | 915 | 648 | 709 | 907 | 647 | 718 | 915 |
| Payroll | 7,177 | 7,899 | 10,169 | 7,205 | 7,882 | 10,080 | 7,193 | 7,983 | 10,164 | 7,177 | 7,899 | 10,169 | 7,205 | 7,882 | 10,080 | 7,193 | 7,983 | 10,164 |
| Employer Contribution / Payroll | 22.4% | 30.1% | 39.2% | 21.9% | 26.4% | 32.0% | 21.2% | 23.2% | 22.8% | 18.4% | 19.8% | 23.3% | 18.4% | 19.9% | 22.8% | 18.5% | 19.8% | 21.6% |
| Employee Contribution / Payroll | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% |
| Total Contributions / Payroll | 31.4% | 39.1% | 48.2% | 30.9% | 35.4% | 41.0% | 30.2% | 32.2% | 31.8% | 27.4% | 28.8% | 32.3% | 27.4% | 28.9% | 31.8% | 27.5% | 28.8% | 30.6% |
| Normal Cost | 732 | 811 | 1,036 | 742 | 812 | 1,027 | 749 | 825 | 1,035 | 732 | 811 | 1,036 | 742 | 812 | 1,027 | 749 | 825 | 1,035 |
| Net amortization $ | (450) | (59) | 1,516 | (188) | 139 | 1,435 | 24 | 522 | 1,603 | (766) | (1,123) | (1,544) | (472) | (589) | (709) | (203) | 109 | 674 |
| Net amortization $ / Payroll | -6.3% | -0.7% | 14.9% | -2.6% | 1.8% | 14.2% | 0.3% | 6.5% | 15.8% | -10.7% | -14.2% | -15.2% | -6.6% | -7.5% | -7.0% | -2.8% | 1.4% | 6.6% |
| | | | | | | | | | | | | | | | | | | |
| **Investment Performance** | | | | | | | | | | | | | | | | | | |
| Compounded Annual Growth - From Start Date | 2.8% | 3.8% | 4.5% | 6.3% | 6.3% | 6.2% | 9.7% | 8.7% | 8.0% | 2.8% | 3.8% | 4.5% | 6.3% | 6.3% | 6.2% | 9.7% | 8.7% | 8.0% |
| Compounded Annual Growth - Segments | 2.8% | 4.8% | 5.2% | 6.3% | 6.2% | 6.2% | 9.7% | 7.7% | 7.2% | 2.8% | 4.8% | 5.2% | 6.3% | 6.2% | 6.2% | 9.7% | 7.7% | 7.2% |

Note: Dollar Figures in Millions

## Exhibit 7

**State**
Mississippi
**Plans Included**
Public Employees' Retirement System

| | State Policy (Current Contribution Policy) | | | | | | Sustainable Budget (Fixed % of OSR) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Deterministic | | | Deterministic | | | Deterministic | | | Deterministic | | |
| | "Low-for-long" Economic Scenario | | | "Asset Shock" Economic Scenario | | | "Low-for-long" Economic Scenario | | | "Asset Shock" Economic Scenario | | |
| Metrics | 2025 | 2030 | 2040 | 2025 | 2030 | 2040 | 2025 | 2030 | 2040 | 2025 | 2030 | 2040 |
| **Balance Sheet Measures** | | | | | | | | | | | | |
| Market Value of Assets (MVA) | 26,990 | 26,630 | 28,381 | 24,595 | 25,981 | 30,690 | 26,537 | 23,555 | 10,081 | 22,837 | 18,777 | 2,631 |
| Actuarial Accrued Liability (AAL) | 52,651 | 56,701 | 60,567 | 54,112 | 58,446 | 63,254 | 52,651 | 56,701 | 60,567 | 54,112 | 58,446 | 63,254 |
| Unfunded Actuarial Accrued Liability (UAAL) | 25,660 | 30,072 | 32,185 | 29,517 | 32,465 | 32,564 | 26,114 | 33,146 | 50,486 | 31,275 | 39,669 | 60,624 |
| Funded Ratio | 51.3% | 47.0% | 46.9% | 45.5% | 44.5% | 48.5% | 50.4% | 41.5% | 16.6% | 42.2% | 32.1% | 4.2% |
| AAL Compound Annual Growth Rate | 2.1% | 1.8% | 1.2% | 2.7% | 2.1% | 1.5% | 2.1% | 1.8% | 1.2% | 2.7% | 2.1% | 1.5% |
| Change in AAL from Prior Year (%) | 1.9% | 1.2% | 0.3% | 2.1% | 1.3% | 0.5% | 1.9% | 1.2% | 0.3% | 2.1% | 1.3% | 0.5% |
| | | | | | | | | | | | | |
| **Cash Flow Measures** | | | | | | | | | | | | |
| Benefit Payments | 3,592 | 4,224 | 5,223 | 3,592 | 4,224 | 5,223 | 3,592 | 4,224 | 5,223 | 3,592 | 4,224 | 5,223 |
| Total Contributions | 2,188 | 2,890 | 4,547 | 2,849 | 3,153 | 4,867 | 1,976 | 2,275 | 2,939 | 1,958 | 2,276 | 2,997 |
| Negative Operating Cash Flow | 1,403 | 1,334 | 676 | 743 | 1,072 | 355 | 1,616 | 1,950 | 2,284 | 1,634 | 1,949 | 2,225 |
| Benefit Payments / Beginning of Period MVA | 13.2% | 15.8% | 18.9% | 15.6% | 16.4% | 17.6% | 13.3% | 17.3% | 44.1% | 16.1% | 21.3% | 111.2% |
| Operating Cash Flow to Assets Ratio | -5.2% | -5.0% | -2.4% | -3.2% | -4.2% | -1.2% | -6.0% | -8.0% | -19.3% | -7.3% | -9.8% | -47.4% |
| Change in MVA from Prior Year (%) | -0.6% | -0.2% | 2.4% | 6.6% | 0.7% | 3.7% | -1.5% | -3.3% | -14.9% | 2.3% | -5.2% | -44.0% |
| Own Source Revenue (OSR) | 12,793 | 15,078 | 19,896 | 12,594 | 14,989 | 20,170 | 12,793 | 15,078 | 19,896 | 12,594 | 14,989 | 20,170 |
| OSR Compound Annual Growth Rate | 2.5% | 2.9% | 2.9% | 2.2% | 2.9% | 2.9% | 2.5% | 2.9% | 2.9% | 2.2% | 2.9% | 2.9% |
| Change in OSR from Prior Year (%) | 2.7% | 3.0% | 2.7% | 3.0% | 3.2% | 2.9% | 2.7% | 3.0% | 2.7% | 3.0% | 3.2% | 2.9% |
| Employer Contributions / OSR | 12.0% | 14.5% | 18.5% | 17.4% | 16.2% | 19.6% | 10.4% | 10.4% | 10.4% | 10.4% | 10.4% | 10.4% |
| Total Contributions / OSR | 17.1% | 19.2% | 22.9% | 22.6% | 21.0% | 24.1% | 15.4% | 15.1% | 14.8% | 15.5% | 15.2% | 14.9% |
| | | | | | | | | | | | | |
| **Payment and Contribution Measures** | | | | | | | | | | | | |
| Employer Contributions (ERC) | 1,539 | 2,179 | 3,671 | 2,197 | 2,431 | 3,961 | 1,326 | 1,563 | 2,063 | 1,306 | 1,554 | 2,091 |
| Change in ERC from Prior Year (%) | 7.5% | 6.3% | 5.4% | 22.1% | 2.2% | 14.1% | 2.7% | 3.0% | 2.7% | 3.0% | 3.2% | 2.9% |
| Employee Contributions (EEC) | 649 | 712 | 876 | 652 | 722 | 906 | 649 | 712 | 876 | 652 | 722 | 906 |
| Payroll | 7,215 | 7,906 | 9,732 | 7,244 | 8,018 | 10,071 | 7,215 | 7,906 | 9,732 | 7,244 | 8,018 | 10,071 |
| Employer Contribution / Payroll | 21.3% | 27.6% | 37.7% | 30.3% | 30.3% | 39.3% | 18.4% | 19.8% | 21.2% | 18.0% | 19.4% | 20.8% |
| Employee Contribution / Payroll | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% | 9.0% |
| Total Contributions / Payroll | 30.3% | 36.6% | 46.7% | 39.3% | 39.3% | 48.3% | 27.4% | 28.8% | 30.2% | 27.0% | 28.4% | 29.8% |
| Normal Cost | 720 | 775 | 941 | 756 | 827 | 1,024 | 720 | 775 | 941 | 756 | 827 | 1,024 |
| Net amortization $ | (375) | (78) | 1,209 | (82) | 18 | 1,480 | (614) | (897) | (1,689) | (1,062) | (1,343) | (2,329) |
| Net amortization $ / Payroll | -5.2% | -1.0% | 12.4% | -1.1% | 0.2% | 14.7% | -8.5% | -11.3% | -17.4% | -14.7% | -16.7% | -23.1% |
| | | | | | | | | | | | | |
| **Investment Performance** | | | | | | | | | | | | |
| Compounded Annual Growth - From Start Date | 4.6% | 4.8% | 4.9% | 3.0% | 4.0% | 4.5% | 4.6% | 4.8% | 4.9% | 3.0% | 4.0% | 4.5% |
| Compounded Annual Growth - Segments | 4.6% | 5.0% | 5.0% | 3.0% | 5.0% | 5.0% | 4.6% | 5.0% | 5.0% | 3.0% | 5.0% | 5.0% |

Note: Dollar Figures in Millions